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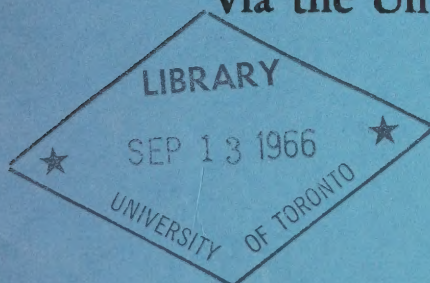
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**NATIONAL ENERGY BOARD**  
**REPORT TO**  
**THE GOVERNOR IN COUNCIL**

**In the Matter of the Application under  
The National Energy Board Act of**

**TRANS-CANADA PIPE LINES LIMITED**  
**to transport natural gas to Central Ontario**  
**via the United States of America**



**August 1966**







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## NATIONAL ENERGY BOARD

IN THE MATTER OF an application of Trans-Canada  
Pipe Lines Limited for:

- (1) A Certificate under Part III of the National Energy Board Act to construct and operate additional pipe line including those facilities necessary to connect its system at Emerson, Manitoba on the international boundary with the system of Great Lakes Gas Transmission Company; to provide service to Sault Ste. Marie, Ontario; to provide transportation facilities from the international boundary on the St. Clair River near Sarnia, Ontario to the storage fields located in Dawn Township, Ontario; and from there to connect with its existing system near Hamilton, Ontario;
- (2) Approval pursuant to Section 36 of the Act of the relocation of a part of the Applicant's pipe line;
- (3) An Order pursuant to Section 17 of the Act to change, alter and vary Licence No. GL-1 as amended by Order No. AO-1-GL-1;
- (4) A Licence under Part VI of the Act for the exportation of gas during a term of twenty-five years commencing on the 1st day of November 1967 at a place on the international boundary between Canada and the United States of America near Emerson in the Province of Manitoba;



- (5) A Licence under Part VI of the Act for the exportation of gas during a term of twenty-five years commencing on the 1st day of November 1967 at a place on the international boundary between Canada and the United States of America near Emerson, in the Province of Manitoba and for the importation of this gas at places on the international boundary between Canada and the United States of America near Sault Ste. Marie and Sarnia, both in the Province of Ontario;
- (6) A Licence under Part VI of the Act for the exportation of gas during a term ending on the 1st day of November 1967 at a place on the international boundary between Canada and the United States of America near Emerson in the Province of Manitoba; and
- (7) A Licence under Part VI of the Act for the importation of gas during a term ending on the 1st day of November 1968 at a place on the international boundary between Canada and the United States of America near Sarnia, in the Province of Ontario.

File: 8-1-1-14

HEARD AT Ottawa on 1, 2, 3, 4, 7, 8, 9, 28, 29 and 30 March 1966.

BEFORE:

I. N. McKinnon, Chairman  
Douglas M. Fraser, Member  
Maurice Royer, Member

APPEARANCES:

N. J. McNeill, Q.C.) F. P. Layton, Q.C. ) R. J. Ludgate )	for Trans-Canada Pipe Lines Limited
A. Findlay, Q.C. ) M. E. Jones, Q.C. ) G. G. Sedgwick )	for Northern Natural Gas Company and Northern Natural Gas Transportation Company
C. E. Creber, Q.C. ) H. J. Knowles )	for The Consumers' Gas Company
J. A. McGrath	for Fuels' Research Council Inc., National Coal Association and United Mine Workers of America
E. J. Courtois, C.R.) J. K. Hugessen )	for Quebec Natural Gas Corporation
R. A. MacKimmie, Q.C.	for Alberta and Southern Gas Co. Ltd.
D. P. McDonald, Q.C.) P. R. Kutney )	for Westcoast Transmission Company Limited
L. G. O'Connor, Q.C.	for Union Gas Company of Canada Limited
W. D. Stuart	for Canadian Petroleum Association
R. R. Colpitts) A. E. Sharp )	for Northern and Central Gas Company
N. E. Richard	for Fort William and Port Arthur District Labour Council
F. H. J. Lamar) J. M. Hendry )	for National Energy Board





### THE APPLICATION

Trans-Canada Pipe Lines Limited ("Trans-Canada" or "the Applicant"), a company incorporated by Special Act of the Parliament of Canada, operates a large diameter pipe line extending eastward from the Alberta-Saskatchewan border to serve cities and communities within the Provinces of Saskatchewan, Manitoba, Ontario and Quebec, with connections on the international boundary between Canada and the United States near Emerson, Manitoba, Niagara Falls, Ontario and Philipsburg, Quebec.

Trans-Canada now proposes that a new pipe line should be constructed by the Great Lakes Gas Transmission Company ("Great Lakes") through the United States passing south of Lake Superior and Lake Huron. The new line would connect with Trans-Canada's existing system at Emerson, Manitoba and with an extension of its system at the St. Clair River near Sarnia, Ontario. A spur line would enable gas to be supplied to Sault Ste. Marie, Ontario. This proposal, referred to as the "Great Lakes Project", is described in detail in the next section of this Report. A map showing the proposed route appears as Appendix 1.

Trans-Canada has applied for a Certificate of Public Convenience and Necessity under Part III of the National Energy Board Act to construct and operate additional facilities in Canada. These would, for the most part, be complementary



to those to be constructed in the United States under the Great Lakes Project. They comprise additional pipe line in Saskatchewan, Manitoba, Ontario and Quebec to enable Trans-Canada to meet its contractual commitments in Canada and the United States.

The Applicant proposes during 1966 and 1967 to carry out the construction programs detailed in the "Extracts from the Application" which appear as Appendix 1 to this Report.

(At the opening of the hearing, the Board accepted a motion of Trans-Canada to adjourn sine die consideration of that part of its certificate application relating to construction in 1967 of facilities linking the facilities of Union Gas Company of Canada, Limited ("Union") in Dawn Township and those of Trans-Canada in Ancaster Township, Ontario; i.e. 123.50 miles of 26-inch O.D. pipe line, a new compressor station (209) near Ancaster, Ontario, and a new compressor station (502) in Dawn Township.

During the hearing, the Board also granted a request by Trans-Canada that its application be further amended by deleting from the indicated 1966 construction program the proposal to add one 275 horsepower engine-driven reciprocating compressor at Station 802 near Candiac, Quebec. This compressor had previously been certificated by the Board under Certificate GC-27.)

The application includes, as part of the 1967 construction program, a request for approval, pursuant to Section 36 of the Act, of the relocation of existing compressor equipment from Stations 70, 84, 95, 119 and 127 in Ontario to Stations 5, 9, 30, 34 and 41 in Saskatchewan and Manitoba.

The application also requests an Order pursuant to Section 17 of the Act to change, alter and vary Licence GL-1, as amended by Order AO-1-GL-1, in the manner indicated in Appendix 2 to this Report.

Trans-Canada also applied for four licences under Part VI of the Act for the exportation and importation of gas at the places and under the terms and conditions detailed in Appendix 2.

NOTE: All volumes of gas in this Report, unless otherwise specified, refer to measurement at standard conditions of 14.73 psia pressure base and 60°F temperature base.





THE GREAT LAKES PROJECT

The principal purpose of the Great Lakes Project was stated to be the provision of Western Canadian gas to Eastern Canada at the lowest possible price. In addition, construction of the line south of Lake Superior and Lake Huron would enable Sault Ste. Marie, Ontario to be supplied with gas and the export market for Canadian gas would be expanded. A further advantage was that the line would pass close to underground storage areas at Austin, Michigan and at Dawn, Ontario.

Great Lakes, which would own and operate the line in the United States between Emerson and the St. Clair River, is a Delaware corporation. The company would be owned as to 50 per cent by American Natural Gas Company ("American Natural"), also a Delaware corporation, and as to the other 50 per cent by Alberta Inter-Field Gas Lines Limited ("Alberta Inter-Field"). The last mentioned is a company incorporated under the laws of the Province of Alberta and is a wholly-owned subsidiary of Trans-Canada.

The new line in Ontario between the St. Clair River and Ancaster as well as the other facilities in Canada called for under the Project would be built by Trans-Canada.



On completion of the Project Great Lakes would transport Trans-Canada's gas from Emerson to the St. Clair River in accordance with a transportation tariff. Great Lakes would also purchase gas from Trans-Canada at Emerson and sell it to customers in the United States at various points along the route. A summary of the terms of the contracts between Trans-Canada and Great Lakes appears in Appendix 3.

Contractual arrangements relating to implementation of the Great Lakes Project have been entered into by Trans-Canada and Great Lakes with a number of other companies in the United States. These companies are listed hereunder and summaries of the terms of these contracts appear in Appendix 4.

Midwestern Gas Transmission Company ("Midwestern")

Midwestern, a Delaware corporation, owns and operates two pipe line systems. The northern system connects with Trans-Canada's facilities at the international border near Emerson and also with the pipe line of Michigan Wisconsin Pipe Line Company at Marshfield, Wisconsin.

Michigan Wisconsin Pipe Line Company ("Michigan Wisconsin")

Michigan Wisconsin is a Delaware corporation and is a subsidiary of American Natural. Michigan Wisconsin

operates a pipe line from Texas and Oklahoma to a point near Chicago, Illinois, whence one branch extends northwest to connect with Midwestern facilities, the other branch extending northeast to a storage area at Austin, Michigan.

Michigan Consolidated Gas Company ("Michigan Consolidated")

Michigan Consolidated, a State of Michigan corporation, is also a subsidiary of American Natural. It owns and operates transmission and distribution facilities in various cities and towns in the State of Michigan, including a pipe line from the Austin storage area to a point in the vicinity of the St. Clair River.

Midwestern already purchases gas from Trans-Canada at Emerson under a contract entered into in 1960. Under the new arrangements Trans-Canada proposes to sell additional quantities of gas to Midwestern at Emerson which gas, less compressor fuel requirements, would in turn be sold to Michigan Wisconsin at Marshfield. Trans-Canada already holds Licence GL-18, as amended, authorizing export of this gas.

During the first two years, pending completion of the Great Lakes pipe line, Michigan Wisconsin has undertaken to make gas available for Trans-Canada's customers



in Eastern Canada from sources in the United States. In the year commencing 1 November 1966 a volume of gas corresponding to that to be purchased by Michigan Wisconsin from Midwestern would be sold by Michigan Wisconsin to Trans-Canada at Austin. This gas would be transported for Trans-Canada by Great Lakes through the new line to be constructed by it between Austin and the point of interconnection with the Trans-Canada system at the St. Clair River. In the following year, commencing 1 November 1967, the quantity of gas sold by Michigan Wisconsin to Trans-Canada at Austin would represent little more than half of that purchased by Michigan Wisconsin from Midwestern at Marshfield. In the third and subsequent years all gas purchased by Michigan Wisconsin from Midwestern at Marshfield would be for distribution to Michigan Wisconsin's own customers in the United States.

Although Trans-Canada intends in due course to build its own pipe line from the underground storage area at Dawn to connect with its existing pipe line at Ancaster, it has made interim arrangements with Union to transport gas from Dawn to a point of interconnection between the Union and Trans-Canada systems at Lisgar. For a period of one year, commencing with the first delivery of gas through

the Great Lakes system, and thereafter at Trans-Canada's option until such time as it commences transporting gas through its own pipe line, Union has undertaken to transport up to 50 million cubic feet of Trans-Canada's gas per day from Dawn to a point of interconnection between Trans-Canada's facilities and those of Consumers' Gas Company ("Consumers'") at Lisgar. Alternatively, from April to October in any year, Union is prepared to accept that volume of gas at Lisgar and deliver the same volume at Dawn for account of Consumers'.





THE INTERVENTIONS

Interventions in general support of the application were filed by Northern and Central Gas Company Limited ("Northern and Central"), Quebec Natural Gas Corporation ("Quebec Natural"), Consumers', and Union each of which is a customer of Trans-Canada engaged in the distribution of natural gas within franchised areas.

Northern and Central stated that it and its subsidiaries Twin City Gas Company Limited, Lakeland Natural Gas Limited and Greater Winnipeg Gas Company are dependent directly or indirectly on Trans-Canada for all supplies of gas and that, if the gas requirements of their customers were to be met, the supply of gas from Trans-Canada would have to be substantially increased without delay. Northern and Central considered that the method proposed by Trans-Canada in its application for expanding its gas transmission facilities was the most feasible way of meeting these anticipated increased gas requirements.

Quebec Natural declared that, as a major natural gas distribution company in Eastern Canada and one of Trans-Canada's largest customers, it relied on the Applicant for a continuing supply of natural gas to meet present requirements and as a source of increasing volumes of gas to meet growing future requirements within the area which it served. Quebec Natural had a vital interest in the rates to be charged to it

for additional gas and had been assured by Trans-Canada that the proposal contained in the application had been designed for the purpose of bringing additional supplies of natural gas to Eastern Canada at the lowest possible cost. Quebec Natural stated that it was of vital interest to the Company, its customers, its shareholders, and the area it served that sufficient additional quantities of natural gas be made available at rates which would enable it to compete with suppliers of other fuels. Quebec Natural stated its intention to actively participate in the hearing toward the end that it be determined that the prices for additional gas would result in the lowest reasonable cost to Quebec Natural.

Consumers' stated that, as a major customer of Trans-Canada presently entirely dependent on Trans-Canada for its gas supply it was vitally interested in any proposal of Trans-Canada which would increase this supply. Further, Consumers' had entered into an additional gas sales contract on 17 November 1965 for a term of twenty-five years and it was vitally interested in the ability of Trans-Canada to carry out that contract. Consumers' accordingly supported the application for all requisite permits and authorizations.

Union declared that Trans-Canada had been the main source of its gas supply since 1958 and that the demand for



gas in Union's service area had been increasing and would continue to increase. Union desired additional quantities of gas from Trans-Canada and Trans-Canada had indicated that delivery thereof might be expedited under a further supply contract dated 1 October 1965 whereby Trans-Canada would use its best efforts to bring gas to Union at Dawn by 1 November 1966 through construction of a portion of the Great Lakes line from the Austin storage field in Michigan to the international boundary near Sarnia and through construction by Trans-Canada of a line from there to Dawn. Union therefore intervened in support of "item 'B' - New Pipe Line" in the 1966 construction program of the application and the issuance of a Certificate under Part III of the Act with respect thereto, and in support of the request of Trans-Canada for the Licences under Part VI of the Act referred to in items "G", "H" and "I" of the application. (See Appendix 2).

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Interventions in support of the application were also filed by the Canadian Petroleum Association ("CPA") and the Independent Petroleum Association of Canada ("IPAC").

The CPA considered approval of Trans-Canada's application to be of vital interest to the producing industry in Western Canada because Trans-Canada had entered into

contracts for the purchase of more than three trillion cubic feet of additional gas reserves located in some 26 additional fields to supply the increasing markets shown in its application. These contracts were conditional upon Trans-Canada obtaining the necessary authorizations. The additional markets foreseen by Trans-Canada as a result of its Great Lakes Project would not only provide revenue to the producing industry from presently shut-in reserves but, in the CPA's view, would create an added incentive for the industry to continue to explore for and develop additional reserves. The CPA also welcomed the opportunity presented by the application for consideration to be given to modifying the methods presently being used for the determination of surplus reserves. The CPA was of the firm belief that the large potential for gas reserves in Western Canada could be developed to meet future requirements providing the incentive of new or additional markets continued to exist.

The IPAC stated in its intervention that the producing industry in Western Canada had a vital interest in the approval of any practical application for the export of gas from Western Canada which would return an adequate well-head price to the producer and would increase demand and exploration for the undeveloped gas potential in Western

Canada, including the Northwest Territories. The IPAC supported the method used by Trans-Canada for calculating the quantity of gas surplus to Canada's needs and expressed confidence that future reserve development would be more than sufficient to provide for future peak day requirements when the need arose as long as the current demand and exploration incentive remained high.

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Westcoast Transmission Company Limited ("Westcoast") as a purchaser of gas in British Columbia and Alberta for sale in British Columbia and for export to the United States declared an interest in the matters raised by the application and intervened for the purpose of conducting examination and presenting argument with respect to the evidence as presented at the hearing.

Alberta and Southern Gas Co. Ltd. ("Alberta and Southern"), an exporter of gas, intervened for the purpose of examining or cross-examining witnesses of Trans-Canada and of other Intervenors, of adducing evidence and of advancing argument.

Northern Natural Gas Company, a major integrated natural gas transmission company in the United States and its subsidiary Northern Natural Gas Transportation Company (referred to hereinafter collectively as "Northern Natural")



has proposed, by application to the Federal Power Commission ("FPC") to construct and operate facilities to render services as a mutually exclusive and competitive alternative to the Great Lakes system. Northern Natural proposes that its transportation company provide services for Trans-Canada similar to the services that Great Lakes would perform for Trans-Canada under the gas transportation and gas purchase contracts filed with the Great Lakes applications to the FPC.

The intervention of Northern Natural in the application before this Board was to the effect that the Certificate, Licences and Orders for which Trans-Canada had applied should be granted on such terms that, if the applications of Great Lakes before the FPC were not granted and the applications of Northern Natural before the FPC were granted, Trans-Canada would be permitted to export Canadian gas to and import United States gas from Northern Natural in quantities corresponding to those proposed by Trans-Canada to be moved through Great Lakes for use in Canada.

At the commencement of the hearing, Trans-Canada made representations to the Board with respect to Northern Natural's intervention. Trans-Canada submitted that, to become an Intervenor in the proceedings, Northern Natural

must, under Section 45 of the Act, persuade the Board that it is an "interested person" and, under Rule 7 of the Board's Rules of Practice and Procedure, it must make a submission from which the Board might determine its interests in the proceeding. Trans-Canada argued that Northern Natural's submission was not, in fact, an intervention but an effort to transform Trans-Canada's application into an entirely new application, unsupported by any agreed plan, contractual or otherwise, as to gas supply, markets or for the movement of gas involved. Accordingly, Trans-Canada submitted that Northern Natural should not be admitted to the proceeding on this basis.

Mr. Findlay, Counsel for Northern Natural, argued in reply that for a party to become an Intervenor in the proceedings, it need only meet the requirements of Rule 7 of the Board's Rules of Practice and Procedure and that his client had met all the requirements of this Rule. Pointing out that his client's submission was not in any sense an application for a "hunting licence" or "any other kind of a licence" and that with one exception it supported Trans-Canada's application, he went on to state that if the Board were to decide it to be in the Canadian public interest that additional gas be transported through the United States, then Northern Natural was interested in the question as to

how such gas should be so transported. It was his view that the effect of the proposed condition (3) of the export-import Licence applied for under Section G of Trans-Canada's application from which condition his client's interest arose, was that the gas imported into Canada must be the same gas exported from Canada at Emerson. If the condition requested by Trans-Canada were to be imposed, its effect would be that Northern Natural would be denied the right to perform in the United States the various requisite gas transportation services because Northern Natural's competitive proposal before the FPC provided for the entry of Canadian gas at Emerson and the importation of United States gas into Canada at St. Clair by way of displacement.

He declared, therefore, that the purpose of his client's intervention was to establish that "it would not be contrary to the Canadian public interest to permit the transportation services in the United States between Emerson, Manitoba and eastern Canada to be performed by the Northern companies ...". He stated that to establish this concept it was his client's wish to introduce evidence respecting its system and to cross-examine witnesses on matters "pertinent" to Northern Natural's submission.



Mr. Findlay concluded his argument by asserting that the question which the Board had to decide was whether or not Northern Natural had an interest in the proceedings within the meaning of Rule 7 of the Board's Rules of Practice and Procedure and Section 45 of the Act, that his client "clearly" had an interest in one aspect of the application, namely whether or not condition (3) as requested by Trans-Canada should be imposed and that it was within the power of the Board to delete or modify the particular condition requested by Trans-Canada "in such a way as to give ample protection to the Canadian public interest without foreclosing the application of Northern companies".

After consideration of Trans-Canada's motion and argument by Northern Natural's Counsel, the Board stated:

"The Board is of the opinion that it could not properly issue the licences under Part III of the application covering the export and import of gas for Canadian consumption in the form requested by Northern. It has been the practice of the Board to grant export and import licences against the background of specific, factual and contractual evidence supporting an application and this is reflected in

the manner in which the licences are conditioned. To accede to the request of Northern would mean the issuance of an export licence and an import licence of vital concern to Eastern Canada in such a form as would enable Trans-Canada, if it saw fit and depending on a Federal Power Commission decision, to negotiate for the export and import of gas for use by Canadian consumers against a set of circumstances substantially different from those envisioned by the application before us, as set forth in the Notice of Hearing and the documentation supporting the application. This the Board is not prepared to do.

"In the event that the Board, with the approval of the Governor in Council, were to issue the certificates and licences applied for by Trans-Canada and in the further event that the Federal Power Commission were to decide that the Northern Companies, rather than Great Lakes Transmission, should receive the requisite United States authorizations, then Trans-Canada could apply to the Board for appropriate amendments to its certificates and licences. Such applications would, in the view of the Board, necessarily be the subject of a further public hearing, with full opportunity to all interested

parties for examination of the facts, contracts and other evidence then relevant to the new project.

"Mr. Findlay submitted that it is a matter for the Board to decide whether or not the particular conditions which Trans-Canada has requested be imposed should, in fact, be imposed, or whether a different set of conditions should be imposed. With this the Board agrees, but it is not prepared to issue a licence as unconditioned as is proposed by the Northern Companies.

"It follows that it would not be appropriate for the Board in this proceeding to hear evidence concerning the Northern Companies' System or the Northern Companies' proposals. The Board agrees that the Northern Companies have complied with rule (7) in respect of the filing of their intervention but this does not mean that the Board has to permit an intervenor to adduce evidence which it considers irrelevant to the application before it.

"It will therefore be apparent that the Board is unable to find the Northern Companies to be an interested person or persons in the full sense proposed by them. It would however seem to the Board to be likely



that its appraisal of Trans-Canada's application would be assisted if the Northern Companies were free to participate in cross-examination and argument to the extent that such cross-examination and argument are kept relevant to the issues now before the Board."

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A joint intervention in opposition to the application was filed by the Fuels Research Council Inc., National Coal Association and the United Mine Workers of America. This intervention concerned that part of the application relating to the export and import of gas to and from the United States and to those certificates which might affect those exports and imports. The Intervenors noted that this gas would be distributed and sold in areas of the United States and Canada in competition with coal and that they had an interest in the mining, processing, transportation and sale of coal. The Intervenors claimed an interest, consistent with the interest of the Canadian public, in ensuring that the price to be charged by Trans-Canada for the gas is just and reasonable. It was also claimed that the export and import of gas on terms which could seriously injure the coal industry in the United States may be detrimental to the Intervenors' interests as

well as to the Canadian public. Reference was made to the fact that the Canadian public presently relied upon United States coal for an important portion of its energy needs. The Intervenor mentioned the importance of the existence of a healthy coal industry in the United States in the event of an international emergency.

In argument, Trans-Canada's Counsel acknowledged that gas transported from Western Canada to Eastern Canada by whatever means would be in competition with coal and all other sources of energy and agreed that the price at which the gas is sold must be just and reasonable. However, the interests of the coal Intervenor were not apparent because it could not be contended that the public interest requires any product to be transported by a more costly method in order to enhance the competitive position of another supplier.

A joint intervention in opposition to the application was also filed by the Fort William - Port Arthur and District Labour Council and Local 628, United Association of Journeymen Plumbers and Apprentices of the United States and Canada and endorsed in principle or in its entirety by a number of unions, municipalities, organizations and individuals. The Intervenor referred to the opposition by their predecessors to plans Trans-Canada was stated to have had whereby its original pipe line would bypass

Northern Ontario and to an eventual change in these plans which had resulted in that pipe line being constructed through Northern Ontario. Although predictions had been made at that time that such a line would not be economically feasible, the Northern Ontario route had been a success. Money loaned by governments had been repaid and Trans-Canada's operations had been a financial success. The Intervenor's stated that, although more than twice as much gas as originally estimated was now being used in Northern Ontario, several industries and communities in Northwestern Ontario are not being served by natural gas and a number of industries and communities are not assured of an adequate supply from the present line for immediate needs, let alone present expansions or anticipated industrial growth. A number of mills which were largely dependent on natural gas for fuel had had to reduce or curtail operations during the past winter due to shortage of gas.

This joint intervention contended that the major reason for building the proposed line through the United States was that the Great Lakes system would cross several transmission lines in the United States and interconnection with these lines would guarantee a continual supply of energy to the highly industrialized sections of Wisconsin, Illinois, Indiana and Michigan.



Although Trans-Canada's proposal envisioned that future expanding markets in Northern Ontario would be provided for initially through greater use of the Great Lakes system in serving Eastern Canada and that the pipe line through Northern Ontario would be expanded in future as required by market growth in that area, the Intervenor's noted that the control over the gas to be transported through the Great Lakes system would pass to the FPC when it entered United States territory and that the National Energy Board would lose all control over it until it re-entered Canada. The Intervenor's questioned what assurance the people of Canada would have regarding the amount of gas, if any, that would be delivered to Eastern Canada and the price at which it would be delivered. The Intervenor's contended that natural gas was a resource belonging to the people of Canada which should be used primarily by and for Canadians and that it should be under the control of regulatory bodies of Canadian governments.

These Intervenor's submitted that the spending of large sums of money on a pipe line through Northern Ontario would be a boost to the whole Canadian economy and would create jobs both in construction and in ancillary services. Unemployment in Northwestern Ontario would be relieved. Pipe and other materials needed in pipe line construction

could be supplied by Canadian manufacturers. Wages paid to construction workers would be an economic boost to many communities in Northwestern Ontario. After completion of the line, permanent employment would be provided in the operation of compressor and distribution stations. Additional income and other taxes collected by all levels of government would be considerable. The cost of various welfare benefits now being paid to unemployed residents of Northwestern Ontario would be reduced.

To meet its objections and to provide maximum use and control of Canadian natural gas, these Intervenor suggested that the present pipe line be looped by a line which would follow the existing line from Manitoba to Kenora; the looping line would then turn south to Fort Frances and thence eastward via Atikokan to interconnect with the present line at Port Arthur and Fort William; from there it could follow the north shore of Lake Superior to Sault Ste. Marie and thence eastward to again interconnect with the present line at Sudbury. The Intervenor submitted that such a route would result in natural gas being available to a number of communities (including Rainy River, Fort Frances, Atikokan, Schreiber, Terrace Bay, Marathon, Heron Bay, Manitouwadge, White River, Wawa and Sault Ste. Marie) and to many large industries which are not now served. The following advantages

were claimed by the Intervenors for such a route:

- "(1) It would create jobs in construction areas with a high unemployment level and boost the economy in many communities.
- (2) It would ensure an adequate supply of natural gas to communities and industries in Northern Ontario where supplies from present line are inadequate.
- (3) It would provide for the already increasing requirements of expanding industries, and for any industrial expansion in Northern Ontario Communities.
- (4) It would service communities and industries in Northern Ontario not now served with natural gas.
- (5) It would provide revenue by taxation to all levels of government, municipal, provincial, and federal.
- (6) It would provide jobs for Canadians in industries manufacturing pipe and pipe line equipment.
- (7) It would keep control of a great natural resource in the hands of Canadians through the National Energy Board.
- (8) It would eventually be of benefit to all Canadians."



These Intervenor further contended that, if the new pipe line were to be built through the United States, all these benefits would be lost. Accordingly, the Intervenor requested that Trans-Canada's application be denied.

A submission of the Lakehead Chamber of Commerce requested the Board "to publish an economic report showing the relative merits of either looping the existing natural gas line through Northwestern Ontario, or the construction of a new line through part of the United States, and that such report should be published, and hearings held before a decision is reached". This resolution was supported or reiterated by the Canadian Lakehead Industrial Commission Incorporated; the Council of the Corporation of the City of Port Arthur; and the Council of the Corporation of the City of Fort William. Argument in support of this submission was given at the hearing by Mr. R. K. Andras, M.P.

In addition to the formal interventions in respect of which appearances were made at the hearing, representations in the form of letters and telegrams opposing the application were received from other organizations shown hereunder in the order of receipt.

Ontario Federation of Labour

Sault Ste. Marie and District Labour Council

Fort William New Democratic Party Riding Association

Kapuskasing and District Chamber of Commerce

Corporation of the Town of Hearst

Communist Party of Canada

Town of Kapuskasing

Council of the Township of Calvert

La Corporation du Canton de Fauquier

La Corporation des Cantons Shackelton and Machin

Corporation of the Town of Smooth Rock Falls

Smooth Rock Falls and Kendrey Chamber of Commerce

Cochrane Board of Trade

Cochrane Federal Liberal Association

Corporation of the Township of Longlac

Mr. J. A. Habel, M.P.

International Co-operative Stores Limited, Port Arthur

Municipality of the Town of Sturgeon Falls

A telegram was received from the Great Lakes Paper Company Limited requesting that the Board, in reaching its decision, suitably recognize that Company's requirement for an abundant supply of gas at current or reduced prices to service existing and future manufacturing needs and to maintain its present competitive position.

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With regard to the intervention of the Fort William - Port Arthur and District Labour Council and other representations opposing the proposed Great Lakes Project, Trans-Canada's Counsel stated that the Applicant did not believe itself to be at odds with the position taken by the Labour Council and others. Counsel argued that the Great Lakes Project was designed to and would accomplish the very results with respect to gas supply at the Lakehead and all across Northern Ontario that those particular Intervenors were seeking.

Trans-Canada contended that the concept of inadequate supply arose from the extensive sale of interruptible gas to large industrial customers and to the curtailment that these customers experience in the wintertime. These interruptible sales represented a sizable portion of the sales in Northwestern Ontario and were beneficial to both the distributor and to industrial customers. Trans-Canada believed that looping through Northern Ontario would not increase the availability of interruptible gas but more capacity would be available if Great Lakes were built. In addition, the Great Lakes Project would bring about a lowering in the cost of gas in Northwestern Ontario which would contribute to the development and maintenance of competitive industry in that area and the creation of permanent jobs rather than temporary construction jobs.



Trans-Canada acknowledged that municipal taxes payable in Northern Ontario by Trans-Canada would be less if the pipe line were built through the United States rather than looped through Canada. However, the lower costs of gas associated with the Great Lakes Project would produce larger sales which in turn would require construction of additional facilities by both the distributors and their customers, all of which would be subject to municipal taxes.

Although objection had been raised to the size of the investment required to be made in the United States under the Great Lakes proposal, Trans-Canada pointed out that that investment would be primarily American funds and that Trans-Canada would acquire 50 per cent control and ownership for an equity investment of \$17,000,000 (US). Trans-Canada also contended that the market stimulation which would be made possible by its plan would generate related investments in Canada equivalent to the \$200,000,000 investment in the Great Lakes system.

Trans-Canada also referred to the increased security of service associated with the Great Lakes route as a consequence of interconnection with another pipe line system and the mutual support consequently available in time of emergency. Furthermore, this route would pass close to storage areas in both Michigan and Ontario. The increased

security would also benefit Northwestern Ontario as the system would be capable of transmitting gas back from the south if an outage occurred east of Winnipeg on the pipe line through Northern Ontario. The full security of a complete alternative line would be attained in two years whereas looping through Northern Ontario would not be complete for an estimated eight years.

With regard to fears expressed concerning lack of Canadian control over the part of the pipe line which would be in the United States, Trans-Canada referred to the Order of the FPC issued 5 August 1960 in the Pacific Gas Transmission Company case in which cognizance was given to "the principles of international comity and mutual responsibility on which the success" of such a project ultimately depends.

Although the Board had been urged to make an economic study of the Great Lakes proposal and the alternative of looping the pipe line in Canada and to then hold public hearings thereon, Trans-Canada argued that the hearing of its application, advertised as it had been, had made provision for wholly adequate consideration of all representations.

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The Department of the Attorney General of the Province of Ontario advised the Board that the Province did not propose to intervene.

The Minister of Mines and Minerals of the Province of Alberta informed the Board that the Government of Alberta did not object to the application and did not intend to oppose it in any way.

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Additional evidence submitted by Intervenors during the course of the hearing is dealt with elsewhere in this Report. For ease of reference, the term "Lakehead Intervenors" is sometimes used hereinafter to mean the Fort William - Port Arthur and District Labour Council and Local 628, United Association of Journeymen Plumbers and Apprentices of the United States and Canada, the Lakehead Chamber of Commerce, and those public bodies, organizations, corporations and individuals who associated themselves with the views of either or both of these Intervenors or expressed substantially similar views to the Board.



On 11 July 1966, the Board received an application from Panhandle Eastern Pipe Line Company ("Panhandle") requesting that an Order of the Board be made granting leave to Panhandle to intervene in opposition to Trans-Canada's application. Panhandle had not been an intervenor during the hearing of that application which commenced on 1 March 1966, pursuant to Board Order GH-1-66. On 20 July 1966, the Board issued Order GH-3-66 setting Panhandle's application down for hearing in Ottawa on 29 July 1966.

At the hearing the Board heard argument from Counsel for Panhandle and from Counsel for Fuels Research Council Incorporated, National Coal Association and United Mine Workers' of America in support of Panhandle's application. Argument in opposition was presented by Counsel for Trans-Canada, Northern Natural, Consumers', Union, Northern and Central, Quebec Natural, the Attorney General of the Province of Ontario, and the Province of Alberta. In addition, the Board was in receipt of telegrams and letters from the Premier of Alberta, the President of IPAC, the Chairman of the Alberta Board of Directors of the CPA and from Westcoast in opposition to the application.

At the conclusion of the hearing the Board rendered the following decision:

" The Board has considered carefully all the arguments which have been placed before it today, and wishes to thank counsel who have participated for their assistance.

Panhandle now asserts that it has a "real and vital interest" in the Great Lakes proposal in that, if the Great Lakes Project were approved, Panhandle would be foreclosed from development of a Canadian market it has been serving for 17 years. That interest was surely as discernible on January 21, when Order GH-1-66 was issued, or February 21, the last day for filing of interventions under the terms of GH-1-66, as it was on July 11, when Panhandle first sought leave of the Board to appear in this matter.

Panhandle could have intervened in accordance with GH-1-66; if it wished more information than Trans-Canada had provided in support of its application it could have asked for additional information and for time to analyze it and to file its observations, studies or evidence in rebuttal. This Panhandle chose not to do. Even after it had filed elsewhere the evidence it now seeks leave to adduce before this Board, it did not request such leave for more than a month.

The Board would be reluctant to depart from the

pattern of procedure set out in its rules so markedly as is proposed by Panhandle, unless it were persuaded that the information to be adduced would add to the evidence already before the Board to a degree materially relevant to a proper decision by the Board. The Board is not so persuaded.

The Board agrees with its own counsel that it would be within its discretion to re-open the hearing. It also believes that such discretion should be used sparingly. In the light of the history of the case and of the arguments made here today, and having regard to the consideration that in the areas in which Panhandle seeks leave to supplement the record, the record is already sufficient to enable the Board to make a proper decision, the Board believes that to exercise its discretion in the manner requested by Panhandle would not, in the circumstances of this case, benefit the public interest.

Accordingly, the motion of Panhandle is dismissed."



EVIDENCE IN RESPECT OF THE APPLICATION

Reserves, Trends, Surplus and Deliverability

Canadian Reserves - Evidence

The Applicant submitted detailed estimates of reserves for those fields in which it has reserves under contract. These estimates cover both proven and probable categories, the latter not being discounted in arriving at its totals. In addition, the Applicant presented data with respect to several fields affected by recent developments and not under contract to any company at the present time, in order that reserves of these fields might be reflected in the overall surplus and in the calculation of trends.

The Applicant estimated the remaining established reserves\* of natural gas in Canada, exclusive of the Yukon and Northwest Territories, to be 44.9 trillion\*\* cubic feet (Tcf). For the purpose of computing Canadian reserves, the Applicant accepted the Board's estimates as of 31 December 1964 for British Columbia, Saskatchewan and "Other Canadian" after deducting estimated 1965 production. Thus, only estimates of reserves in Alberta were up-dated by the

\* In making this estimate the Applicant included all proven reserves plus 50 per cent of probable reserves. The established reserves calculated by the Board include all proven reserves plus a varying percentage, not exceeding 50, of probable reserves.

\*\* One trillion is  $10^{12}$ .

Applicant to 31 December 1965. For this reason, the Applicant believed that its estimate of total reserves should be considered as a minimum.

The Applicant estimated that the reserves in the "presently considered beyond economic reach" category were 3.0 Tcf for Alberta. The Applicant accepted the Board's estimate as of 31 December 1964 for British Columbia of 0.4 Tcf.

The Applicant estimated that the reserves deferred for reasons of conservation were 4.5 Tcf.

#### Canadian Reserves - Conclusions

Having considered the evidence relating to reserves and the advice of its staff, the Board estimates the established reserves for Canada to be 44.6 Tcf as of 31 December 1965. A comparison of the estimates submitted by the Applicant and those adopted by the Board is shown in the following tabulation.

#### Established Reserves - Tcf

(14.73 psia and 60°F - 31 December 1965)

	Alberta	B.C.	Sask.	Other Areas	Total
TCPL	38.7	/	6.2	/	44.9
NEB	37.8	5.5	1.0	0.3	44.6

The Board has also reviewed the matter of reserves presently considered to be beyond economic reach. It has had the benefit of opinions expressed both during the present hearing and the one conducted in March-April 1965.

The Board, in determining the reserves beyond economic reach, took into consideration the size of the reserves, their geographic location and whether or not deliveries from these fields could be contracted for and commenced within a period of four years. The Board concludes that, of the Canadian established reserves of 44.6 Tcf, 3.1 Tcf are now beyond economic reach; of this total, 2.7 Tcf are located in Alberta and 0.4 Tcf in British Columbia.

The Board has also considered the matter of reserves presently deferred for reasons of conservation. For such fields the basis of assessing availability was whether or not deliveries could be contracted for and commenced within a period of four years. The Board estimates that 4.3 Tcf of reserves are deferred for reasons of conservation, all of which are in the Province of Alberta.

#### Canadian Reserve Trends - Evidence

The Applicant's analysis showed that trends in growth of reserves had averaged 3.0 Tcf per year for Canada during the past ten years. This average could, in the



Applicant's view, be expected to continue for the next thirty years, although actual growth rate in the future would be more directly related to markets available than has been the case in the past.

Westcoast also gave evidence on the subject of trends, and argued that the Board, in determining future surplus, should take into account a longer period of trends in growth of reserves than the twenty years it had used in the past.

#### Canadian Reserve Trends - Conclusions

In its Reports to the Governor in Council of March 1960, and July 1965, the Board explained the usual methods of determining and estimating the trends in gas reserves, as well as the factors which must be considered in projecting these trends. In the latter Report, the Board concluded that trends in growth of reserves in Alberta are likely to average 1.8 Tcf annually during the next twenty years and 0.5 Tcf annually in British Columbia during the same period. A rate of 0.1 Tcf per annum was adopted for other areas in Canada.

The Board has examined the results of 1965 drilling and finds that for Alberta the growth in reserves was slightly above that forecast in the July 1965 Report. However, in British Columbia there appears to have been a lower

rate of reserve growth than that forecast by the Board. In this connection, the Board pointed out in its Report of July 1965 that growth of reserves for individual years might fluctuate widely from the average anticipated over a 20-year period. Results for British Columbia during 1965 seem to represent such a fluctuation. Moreover, since these somewhat disappointing results appear to be related to a slower pace of development drilling rather than a lack of new discoveries in British Columbia, the Board continues to expect that the annual growth rate will average 0.5 Tcf for that Province over the next twenty years, and 2.4 Tcf for all of Canada during the same period.

The Board will continue to examine most carefully the growth trends of gas reserves and, if a significant change in the rate of additions to reserves through new discoveries or appreciation of previous discoveries were to continue, the Board would alter its estimate of the overall trend in growth.

Appendix 6 is a time plot of total Canadian established reserves on a fully appreciated basis and also shows the same data for Alberta, British Columbia, and "Other Canadian". It indicates that, based on the average rates of growth estimated, the initial established reserves of Canada would be 130 Tcf by 1995.

The Board has also given consideration to the suggestion made by the Applicant and Westcoast that the determination of future surplus should take into account trends beyond the 20-year period, which the Board previously adopted. The Board is still of the opinion that twenty years is a reasonable period for this purpose.

#### Canadian Surplus - Evidence

As in the March-April 1965 hearing, Trans-Canada presented evidence in support of the concept that Canadian requirements and requirements to meet existing export Licences should be protected by "contractable reserves"\*, provided that the current trends in reserve growth give clear indication that the additional needs of Canada can be safely met for the next thirty years, including peak-day protection in the thirtieth year.

In its application, Trans-Canada made the following statement regarding the method used by the Board in its previous Reports in determining the amount of established reserves needed to provide Canadian market requirements and the requirements of existing export Licences:

"The amount of reserves set aside would increase significantly for some years if the Board's method is

\*i.e. Those reserves which a pipe line company would offer to purchase under contracts which contain take-or-pay commitments.



not changed because the reserve-life index, or ratio of reserves to annual requirements, of the major purchasers will inevitably decrease for several years. The reason for this is that gas is normally purchased on a basis of a fixed take per unit of original reserves. For instance, if gas is purchased on a basis of one MMcf/d for ten Bcf of reserves, this represents a 24-year life (assuming an average between minimum and maximum rates) for new purchases. Each year the remaining life of the reserve becomes one year less until a decline in deliverability makes it possible, having regard to take-or-pay obligations, to contract for additional reserves to supply the same unit of market. On an overall basis, as a market matures, the reserve-life index will fall for some years before it levels out. The Applicant believes that the method used to calculate the present reserve requirements should reflect this decrease in actual requirements in order to avoid a build up of shut-in reserves, which would have a detrimental effect on the incentive to explore for and develop gas reserves."

The Applicant averred that a reasonable level of protection for Canadian markets would be provided if established contractable reserves were set aside in an amount equal

to 23 times the requirements forecast for the year 1969. Trans-Canada also stated that it was able to contract with producers on this basis.

The Applicant's contention was supported in this regard by its four major Eastern Canadian customers, each of whom expressed the view that it relied, for the protection of its own market requirements, upon the overall contractual arrangements between itself and Trans-Canada and between Trans-Canada and the producers. In addition, the very good prospects for development of increased gas reserves in Western Canada could be relied upon in respect of maintaining deliverability.

Concerning markets served by present export Licences, Trans-Canada's application stated that these would be adequately protected by using 23 times the presently permitted annual quantity. However, in its testimony the Applicant made it clear that it was not suggesting that these export markets should have or would require the same protection as Canadian markets. It stated that "the Board will, of necessity, under the method we suggest, have to consider this matter each time an application is filed before the Board and may well have to use a different number of years as time goes on for the export market than ... for the Canadian market". The Applicant expressed the opinion

that both its export customers and the FPC relied upon the contractual arrangements and the terms of the export Licences for assurance of gas supply, rather than the peak-day protection provided in the Board's method of calculating surplus.

In its original submission Trans-Canada included, in its determination of contractable reserves, one half of the reserves now considered beyond economic reach, i.e. 1.7 Tcf. However, in its evidence at the hearing, the Applicant altered its stand and suggested that no reserves presently beyond economic reach should be included in the calculation of contractable reserves. The Applicant also believed that all reserves now deferred for reasons of conservation should be excluded from the determination of contractable reserves.

Alberta and Southern supported the general method suggested by Trans-Canada for protection of Canadian markets. As in the March-April 1965 hearing, Alberta and Southern believed that Canadian requirements would be adequately protected by setting aside from contractable reserves an amount equal to 25 times the forecast demand for the year 1968 (i.e. the third year level). However, the company did not believe that it would be proper to protect existing Licences beyond the amounts which could be exported during



the remaining term of each Licence and in conformity with the conditions of each Licence.

Alberta and Southern also differed from the Applicant in respect of the treatment to be given to those reserves presently considered beyond economic reach and also in respect of reserves deferred for reasons of conservation. Its view, reached after discussions with producers, was that significant portions of both of these categories of reserves were contractable at the present time for delivery beginning in 1969 or the early 1970's. For this reason, Alberta and Southern believed that the calculation of contractable reserves should include some portion of the amounts of gas presently beyond economic reach or presently deferred for reasons of conservation.

Westcoast gave evidence in respect of surplus and the methods which might be used to compute Canadian and export requirements. The company estimated that the method previously used by the Board represented a 28 to 30-year life index, calculated by dividing "current reserves" by the fourth-year level of projected demand. Although it might not be practical for pipe line companies to purchase gas on this basis, Westcoast believed that this level of protection for Canadian requirements was quite reasonable.

However, the company believed that the Board's method of protecting export Licences presented an anomalous situation in which export Licences terminating during the period from the twenty-first to the twenty-fifth year were provided with peak-day protection, whereas, in the case of export Licences expiring within twenty-one years, the reserves provided for terminal year peak-day protection were credited to surplus. In Westcoast's view, this created inequities among existing Licences and, if continued, might prompt applications for Licences having terms slightly less than twenty-one years, thereby reducing the reserves required to support such Licences by as much as 25 per cent compared with applications for Licences having terms slightly longer than twenty-one years. For this reason, and also because pipe line companies and their customers do not view their Licences as representing a guarantee that sufficient gas will be available to maintain full deliverability over the life of the Licence, Westcoast believed that no terminal year peak-day protection should be provided for any export Licences in the determination of current surplus.

Westcoast appreciated the Board's concern that, since in many instances both Canadian requirements and export requirements are supplied from the same sources, there might

possibly be an encroachment on reserves required for Canadian markets unless terminal year peak-day protection for the exports was provided. However, in its view, such a possibility could not occur as long as there continued to be adequate annual increases in reserves. It suggested that present levels of reserve trends would have to be substantially reduced for such a possibility to arise. In this connection, Westcoast submitted an exhibit showing that the 30-year Canadian requirements, including terminal year peak-day protection, and requirements for exports now licensed, could be provided from present reserves plus a growth rate averaging approximately 1.5 Tcf per year over the thirty years.

In respect of reserves presently beyond economic reach, and reserves deferred for reasons of conservation, Westcoast took the position that at least 50 per cent of the former could be credited to established reserves, and that only reserves deferred beyond thirty years for reasons of conservation should be excluded from established reserves.

#### Surplus - Conclusions

The Board has reviewed the various suggested methods of protecting Canadian requirements, existing export commitments, and the export authorizations herein requested. The Board has also re-examined the method which it used in



its Report of July 1965. As a result of these considerations, the Board has decided that the following principles will be applied in determining current surplus:

- (a) Available reserves will include the remaining volumes under existing import Licences, plus contractable reserves. The Board considers contractable reserves to be those established reserves which it believes a purchaser will be able to contract for, with delivery to begin within the next four years.
- (b) Protection of Canadian gas requirements at an adequate level will be achieved if an amount of reserves equal to 25 times the estimated requirement level for the fourth year is set aside. The multiplier of 25 was selected not only because it appears to the Board to supply adequate protection under presently foreseeable circumstances, but also because it corresponds with the 25-year maximum term for export Licences which can be granted by the Board. The fourth-year level was selected because it corresponds with the current policy of the pipe line companies in contracting for the purchase and sale of gas. These contracts provide for a time interval of not more than four years before acceptance and delivery of gas to meet forward requirements.

In cases where authorization for removal of gas from the province in which it is produced is required by a statute of that province, the amount of protection provided for markets in the province will be the amount set by the province to be its requirement or the amount computed by the above rule, whichever is greater.

(c) Canadian market requirements, existing export Licences, and those for which applications are under consideration, will not be given terminal year peak-day protection from established reserves provided that a surplus is indicated by calculating the difference between

- (1) the established reserves plus those indicated by the trends in the growth of reserves, and
- (2) the forecast Canadian requirements over a 30-year period, including terminal year peak-day protection plus export commitments

and, further provided that in the opinion of the Board, the trend in the growth of reserves justifies continued confidence.

In accordance with the principles stated above, the Board has determined the volume of reserves which it considers to be necessary to meet Canadian gas requirements and those for existing export Licences. These calculations are shown in Appendix 7. This Appendix also sets out the Board's estimate of the amount of gas required to supply the present export application, exclusive of gas to be returned to Canada.

The following tabulation summarizes the Board's findings as to the reserves available as of 31 December 1965, the volumes of these reserves needed to supply current requirements, plus those associated with the present export application, and the derived current surplus position.

Current Surplus as at 31 December 1965

(All Volumes in Tcf)

	at 14.73 psia and 60°F	1,000 Btu's per Cubic Foot
<u>Available Reserves:</u>		
Established Reserves	44.6	47.1
<u>Less</u> Beyond Economic Reach	-(3.1)	-(3.3)
<u>Less</u> Deferred for Conservation	-(4.3)	-(4.8)
Total Contractable Reserves	37.2	39.0
Plus Remaining Imports under Existing Licences	0.2	0.2
Total Available Reserves	37.4	39.2
<u>Requirements:</u>		
Canada, except Alberta		16.5
Alberta*		6.6
Existing Export Licences		10.4
Present Export Application (exclusive of gas to be returned to Canada)		0.8
Total		34.3
Current Surplus		4.9

\* Where authorization for removal of gas from the province in which it is produced is required by a statute of the province, the amount of protection provided for markets in the province will be the amount set by the province or the amount computed by the Board's rule whichever is the greater. OGCB Report 66-C shows a requirement of 6.6 Tcf compared with the Board's estimate of 6.2 Tcf.



Accordingly, the Board concludes that there will be a current surplus of available reserves in Canada in the amount of 4.9 Tcf.

As to future surplus, Appendix 7 shows the requirements of Canadian markets for a 30-year period in a form similar to that used in the Board's July 1965 Report. It should be noted that the corrected reserves-deliverability ratios (CF) and the ratios of marketable gas to gas in place (K) are the same as used in the July 1965 Report, with the exception that new factors have been determined in respect of fields serving "Canada east of Alberta". These new factors were obtained from the Board's detailed deliverability forecast which was based upon reserves as set by the Board for Trans-Canada's supply fields, basic deliverability data supplied by Trans-Canada for those fields, and the Board's estimate of annual and peak-day gas requirements to be served by Trans-Canada's system.

Annual and peak-day requirements of Canadian markets were forecast for the next thirty years and the results are shown in Appendix 8. Allowance has been made in the calculation for the amount of storage and other peak-shaving capacity forecast to be available.

The following tabulation summarizes the Board's estimate of the reserves available as of 31 December 1965, the growth in reserves over the next twenty years, the volumes

necessary to protect Canadian requirements for the next thirty years including terminal year peak-day protection, the volumes of gas necessary to protect existing export Licences as well as the export volumes now under consideration, and the derived future surplus position.

Future Surplus as at 31 December 1965

(All Volumes in Tcf at 1,000 Btu's per Cubic Foot)

Future Supply

Available Reserves	39.2	
Established Reserves to become contract- able between the 5th and 30th year		
(a) from reserves presently beyond economic reach	3.0	
(b) from reserves presently deferred for conservation	4.3	
Trends: 2.4 Tcf/year x 20 years	48.0	
Total		94.5

Future Requirements

Canada, except Alberta, including terminal year peak-day protection	51.8	
Alberta, including terminal year peak-day protection	17.7	
Existing export Licences	10.4	
Present export application (exclusive of gas to be returned to Canada)	0.8	
Total		80.7

Future Surplus

13.8

The Board anticipates that Canadian reserves will continue to grow beyond the 20-year period. However, the estimates of growth within that period indicate that all of the requirements on the specified basis will be served and a future surplus of reserves in the order of 14 Tcf will be developed.

Trans-Canada's Reserves and Deliverability

Trans-Canada presented evidence concerning reserves for all of the pools for which it has gas purchase contracts, including pools covered by Alberta and Saskatchewan permits to others and committed to Trans-Canada. The Applicant estimated proven and probable reserves under its control to be 14.2 Tcf as of 1 March 1966.

The Board has completed a review of each of the gas pools under contract to Trans-Canada and the fields covered by permits to others who supply Trans-Canada. The Board concludes that the Applicant had 14.1 Tcf of established reserves under its control as of 31 December 1965.

At the time of the hearing, the Applicant held Alberta Permit TC 64-6 which expired on 31 October 1989 and which authorized the removal from the Province of 12.0 Tcf. It had applied to the Alberta Oil and Gas Conservation Board ("Alberta Board") to have additional fields covered by a new permit which, when consolidated with TC 64-6, would authorize



removals amounting to 14.9 Tcf and would terminate on 31 October 1990. The Alberta Board has since issued an amendment to permit TC 64-6 dated 29 June 1966 which authorizes Trans-Canada to remove from Alberta 1,984 MMcf per day, 661 Bcf during any consecutive twelve-month period ending 31 October and 14.9 Tcf during the term of the permit. The permit has the requested expiry date of 31 October 1990. The amount remaining after deducting volumes removed to 31 December 1965 is 13.2 Tcf.

In addition to the Alberta permit which the Applicant holds in its own name, it also purchases gas from other companies which have eight Alberta permits. These permits authorize the removal from the Province of 235 Bcf of which approximately 190 Bcf remain as of 31 December 1965. Expiry dates of these permits range from 31 December 1984 to 31 May 1990. Finally, the Applicant has a gas purchase contract with Steelman Gas Limited and Provo Gas Producers Limited for gas produced from the Steelman Plant in Saskatchewan. These companies have been issued Saskatchewan Gas Permit No. 1 covering all gas produced by the Plant for a term expiring on 2 February 1990. Trans-Canada estimates the remaining production will be approximately 60 Bcf.

In summary, the Applicant has provincial permit arrangements supported by purchase contracts which cover a

total remaining supply of 13.5 Tcf as of 31 December 1965 and an aggregate maximum daily amount of 2,047 MMcf.

Trans-Canada filed an illustrative deliverability schedule to demonstrate the ability of its proven and probable reserves to meet annual and peak-day requirements for each of the years ending 31 October from 1966 to 1990 inclusive. This schedule was predicated on the Applicant's estimate of proven reserves plus 50 per cent of probable reserves for each field and pool under contract. It showed requirements levelled at the figure forecast for 1970, thus including the additional export volumes herein requested, but not reflecting the expiry of the existing export or import Licences held by the Applicant.

Comparison of the total maximum-day volumes of gas available with the total peak-day requirements upon the Applicant's system, including those which are the subject of this application, indicates that total deliverability would fall short of meeting annual and peak-day requirements in 1980 by 14 Bcf and 42 MMcf respectively. By 31 October 1990, the annual deficiencies would total 2,574 Bcf, while the annual and peak-day deficiencies in that year would be 427 Bcf and 1,283 MMcf respectively.

The Board has prepared a detailed deliverability schedule using a computer program previously developed.

This deliverability schedule was based on the established reserves of the Applicant's fields as set by the Board and also on the Board's estimate of Trans-Canada's markets levelled at the figure forecast for the year 1969 as shown in Appendix 9. However, the Board's forecast made adjustments in market requirements upon Trans-Canada's system to reflect the expiry of the following export and import Licences:

<u>Export Licence Numbers*</u>	<u>Held By</u>	<u>Expiry Date</u>
GL-1	Trans-Canada	14 May 1981
GL-2	Trans-Canada	31 Dec. 1966
GL-6	Niagara Gas	30 June 1980
GL-18	Trans-Canada	31 Oct. 1989
GL-19	Trans-Canada	31 Oct. 1989

<u>Import Licence Numbers*</u>		
GL1-1	Union Gas	5 Nov. 1976
GL1-2	Trans-Canada	1 Nov. 1970

\* See Appendix 7 for total remaining volumes and peak-day deliveries.

Appendix 10 shows the requirements of Trans-Canada's pipe line system, as used in the deliverability studies, along with annual and peak-day deficiencies of Trans-Canada's gas supplies as forecast by Trans-Canada and as forecast by the Board.



The analysis prepared by the Board indicates that Trans-Canada would be able to maintain peak-day deliverability for 13 years from 1 November 1965 until 1 November 1978, with the first deficiency occurring one year earlier than forecast by Trans-Canada. However, the overall total deficiency of 2,220 Bcf is some 354 Bcf lower than estimates by the Applicant as a result of adjusting the estimate of the markets to be served by Trans-Canada to reflect the expiry of the existing export and import Licences as noted previously.

The Board is satisfied that the reserves required to meet annual and peak-day deficiencies forecast to be experienced by Trans-Canada, can be made available from the difference between the reserves of 14.1 Tcf controlled by Trans-Canada and the amount of 17.3 Tcf of established reserves allocated by the Board to protect Canadian requirements east of Alberta, Trans-Canada's present export commitments and the volumes applied for. The Board considers that the policy Trans-Canada has pursued to date in purchasing reserves has been satisfactory. Assuming that this policy is continued, and having in mind the various facts concerning supply of gas in the territory in which the Applicant purchases gas, the Board is confident that Trans-Canada can and will contract for the additional gas reserves necessary to offset the deficiencies now apparent.

MarketsCanadian Markets - Evidence

The Applicant submitted that reduction in the cost of transmission resulting from completion of the Great Lakes Project would permit Trans-Canada to reduce its rates below those otherwise applicable and hence enable existing Canadian markets to absorb substantially increased quantities of gas. The reduction in price was expected to be of particular importance to the industrial market. Only one new Canadian market area, that of Sault Ste. Marie, would be attached.

Of special significance was the fact that a very substantial portion of Trans-Canada's market for gas was in Southwestern Ontario where gas storage facilities were also located. Completion of the Great Lakes Project would enable Trans-Canada to deliver gas to the distributors, for immediate use or for storage, by a shorter route than via Northern Ontario and, at the same time, it would release capacity in the Northern Ontario portion of the line for development of markets in that area.

Evidence in regard to market developments expected in Eastern Canada, together with an assessment of total Canadian demands, was provided by the Applicant. This latter

estimate of annual and peak-day demands for natural gas for use in Canada generally agrees with that adopted by the Board in its July 1965 Report. The market forecasts submitted by Trans-Canada are summarized in Appendix 11.

For Manitoba and east thereof, the short-term forecasts to 1971 were prepared by Trans-Canada in consultation with distributors. Those beyond 1971 were estimated by Trans-Canada itself. The distributors supported Trans-Canada's forecasts.

Among the major gas distribution utilities which are customers of Trans-Canada, Consumers', Union and Northern and Central have signed contracts contingent either specifically or in effect upon completion of the Great Lakes Project. (See Appendix 5).

The new sales contracts with distributors provide for prices for additional gas lower than prices applicable to gas delivered under existing contracts. In order to encourage additional industrial sales, new industrial rates would be reduced more than would general service rates. Trans-Canada testified that on a 100 per cent load factor basis reductions to distributors for the general service and special industrial rates in its respective rate zones would be as follows:



Reductions Applicable to New Demands

<u>Trans-Canada Rate Zone*</u>	<u>General Service</u> (Cents per Mcf)	<u>Special Industrial**</u> (Cents per Mcf)
Saskatchewan	Nil	Nil
Manitoba	Nil	1.8***
Western	.33	2.7
Northern	.82	3.4
Central	2.30	3.6
Eastern	2.50	4.2

\* See Map - Appendix 1

\*\* Generally applicable for six contract years only,  
unless extension is mutually agreed in writing.

\*\*\* Applicable only to 50 per cent of new demands.

Trans-Canada indicated that, while little change in its Canadian markets in Saskatchewan and Manitoba might be attributable to completion of the Great Lakes Project, the industrial markets in the Western, Northern and Central Rate Zones would be affected. Its estimates for consumption in Ontario were inclusive of the Hull and Rouyn-Noranda regions of Quebec because these areas were supplied with gas sold by Trans-Canada to Ontario distributors.

The distributors in Eastern Canada supported the view that no significant change in volume in the domestic and commercial sectors of the market would result from the

new sales contracts. They agreed with Trans-Canada that the proposed lower gas prices would materially increase industrial demand.

Northern and Central, formerly Northern Ontario Natural Gas Company, either directly or through subsidiary companies, is the distributor providing gas service to communities in Ontario in an area extending about 1,100 miles from a point near the Manitoba - Ontario boundary along Trans-Canada's present system as far as Orillia, and also to a number of communities along the north shore of Lake Ontario from Port Hope to Cornwall. The group also serves the Winnipeg and Selkirk areas of Manitoba and the Rouyn - Noranda area of Quebec. It thus is involved in purchasing gas in Trans-Canada's Manitoba, Western, Northern, Central and Eastern Rate Zones.

Northern and Central's essential function is to buy gas at the highest possible load factor, and by various combinations of firm and interruptible sales contracts, together with making use of the diversities in load which develop over so large an area, to provide economical gas

service to a number of regions each of which taken separately would have a lower load factor and consequently a relatively higher cost of gas. This concept involves transferring gas from one rate zone to another, and Northern and Central has agreements with Trans-Canada, related to its purchase contracts contingent on Great Lakes, which provide for several such transfers.

Northern and Central's testimony emphasized that, while it continually seeks to upgrade its sales to its customers, the further development of the industrial market in its service areas requires ample supplies of gas which can be marketed as "valley gas", at prices competitive with other energy forms available to industry, and that the contracts offered to it contingent on the Great Lakes Project fitted this requirement better than any alternative available to Northern and Central. As a specific case in point, Northern and Central had committed itself to build a lateral some 60 miles long to Atikokan, and to provide industrial, residential and commercial service there, in anticipation of Great Lakes prices prevailing.

In Trans-Canada's Central Rate Zone the two principal gas distributors, Consumers' and Union, now receive deliveries from Trans-Canada in the Toronto-Hamilton area. Trans-Canada indicated that under its zone price



structure the price of deliveries to distributors from the proposed Great Lakes facilities would be the same at Dawn as in the Toronto-Hamilton area. Since both these distributors make substantial use of storage capacity in the Dawn area, the installation of the new Trans-Canada facilities, and delivery at Dawn under Central Zone rates, would save them the cost of transporting gas for storage some 124 miles from the Toronto-Hamilton delivery points.

Under the Great Lakes agreements Consumers' would purchase additional gas on a seasonal basis, interruptible during limited periods of seasonal peak demands. At least half of the gas to be delivered under these agreements, or 25 per cent of Consumers' total purchases from Trans-Canada would be delivered to storage at Dawn. It was Consumers' opinion that the average price of this new gas, on a contracted daily demand basis, would be some three cents per Mcf less than deliveries by way of a northern line.

The main Consumers' contract contingent upon Great Lakes provided for a price of 43 cents per Mcf, and the supplemental five-year contract which covered supplies subject to interruption at any time would make gas available at 36 cents per Mcf. By 1971 approximately 50 per cent of Consumers' total gas requirements would be taken under the Great Lakes contracts, so that, if the expected reduction

of three cents per Mcf were achieved, the overall cost of gas to the company would be approximately 1.5 cents per Mcf lower than under previously existing contracts with Trans-Canada.

Consumers' indicated that Trans-Canada demonstrated to its satisfaction that the Great Lakes line was the best and most economical way of meeting the requirements of Consumers'.

In support of the Great Lakes Project, Union stressed that since it would receive deliveries there-under near Sarnia and at Dawn as well as at its present delivery points, it would be able to maintain better service under all conditions as well as to improve its competitive position.

Union stated that Trans-Canada supplied about 71 per cent of its requirements and that this was expected to rise to 85 to 90 per cent in five years.

In Union's most recent contract with Trans-Canada, known as the 1964 contract, the price was 43 cents per Mcf for a total of 10 Bcf per annum, escalating after three years to 45 cents. However, under the contracts contingent upon Great Lakes the price for the additional gas would commence at 39.15 cents, rising to 40.85 cents per Mcf in the seventh year and thereafter. The maximum annual volumes would rise

from 25 Bcf in the first year to 54 Bcf in the sixth year. Union anticipated that, with completion of Great Lakes, industrial sales would increase from the current 34 per cent of total sales to approximately 60 per cent by 1969.

In the relatively isolated Sault Ste. Marie market the franchised distributor, Great Northern Gas Company, now operates a propane-air system which supplies the community from a central storage area and from individual tanks. The system of mains would require considerable expansion if natural gas were made available. The capital cost of such expansion was not yet established. While substantial agreement for natural gas supply had been reached and the definitive terms and conditions were being finalized, no contract or agreement had as yet been signed with Trans-Canada. It was claimed that the cost of industrial firm gas offered by Trans-Canada to the distributor (i.e. 41 cents per Mcf at 100 per cent load factor) would enable industrial gas sales to be secured although no contractual arrangements for such sales had as yet been made. It was also suggested that natural gas could displace other fuels used by four major industrial firms in the area and the market forecasts submitted indicated that industrial requirements would constitute about 90 per cent of total



sales in the early years. It was intended that, with the advent of natural gas to the area, a reduction in rates charged for residential and commercial service would be introduced.

In Trans-Canada's Eastern Rate Zone, gas is purchased from Trans-Canada by a number of distributors, principally Consumers', Northern and Central and Quebec Natural for distribution in Eastern Ontario and Quebec.

Since, in Trans-Canada's market estimates, Rouyn - Noranda and Hull were included in the Ontario figures, its estimates for Quebec refer only to the Montreal area and the St. Lawrence South Shore to Sorel.

Quebec Natural expected that, in accordance with current negotiations, if the Great Lakes Project were built additional volumes of firm gas for general service would be offered by Trans-Canada at a price of 2.5 cents per Mcf below the otherwise applicable rate schedule. Gas supplied under the new "Special Industrial" tariff would be available at 4.2 cents per Mcf below the otherwise applicable rate. Quebec Natural stressed the need of having large volumes of interruptible gas supplies available to assist in the development of large industrial firm loads. While intending to take advantage of all peak-shaving

opportunities Quebec Natural believed that the sale of "valley gas" in a profitable market was preferable to the use of peak-shaving facilities.

Quebec Natural stated that it was satisfied from information available to it that its cost of additional gas supplies would be lower with the Great Lakes Project than would otherwise be the case.

#### Canadian Markets - Conclusions

The estimates of Canadian markets adopted by the Board are given in Appendix 12. The assumptions underlying these estimates include the premise that, so far as Trans-Canada's service area is concerned, the prices offered by Trans-Canada contingent on the Great Lakes Project would be put into effect.

The Board's estimates of Canadian requirements for natural gas differ slightly for several of the provinces when compared with the estimates submitted by the Applicant. For Saskatchewan and British Columbia the Board's estimates are substantially higher.

The Board's estimates for Saskatchewan reflect increased use of natural gas in thermal generation in the earlier years as well as the continued expansion of the potash and other industries. In its estimates for British

Columbia the Board included natural gas demand for thermal generation to 1969, the proposed extension of service to Prince Rupert in 1967 and, in 1969-70, to Vancouver Island.

With respect to the area served by Trans-Canada east of Manitoba, the Board accepts the aggregate estimates of the Applicant, upon the postulate of the prices contingent on the Great Lakes Project being put into effect. The Board has some reservations as to detail, but these tend to balance out in aggregate.

In reaching this conclusion the Board has taken into consideration the fact that the Applicant's market forecasts for 25 years by sector of consumption and by provinces were supported by distributors and were not challenged by the other Intervenor.

The Board estimates that, over the 30-year period, 1966-1995, Canadian requirements would be 46.6 Tcf, i.e. 1.7 Tcf greater than estimated by the Applicant.

#### Export Markets - Evidence

It was Trans-Canada's submission that the construction of the Great Lakes pipe line would expand the export market for Canadian gas. This was substantiated by Precedent Agreements providing for two sales contracts. The advantage of having access to growing markets in the United States was also referred to by the Applicant.



The first contract, that between Trans-Canada and Great Lakes, would cover export sales rising to 32.1 Bcf per annum by 1976. Trans-Canada's forecasts of requirements indicated that Great Lakes would be purchasing from Trans-Canada, for fuel and for resale, more than 32.1 Bcf in each year after 1971, rising to some 43 Bcf by 1976. A further export licence, in addition to the one now applied for, would be necessary to authorize the delivery of any gas in excess of 32.1 Bcf.

The second contract, that between Trans-Canada and Midwestern, would provide for maximum daily quantities of 116 MMcf (annual delivery was estimated at 36 Bcf). Under a related contract Midwestern would sell to Michigan Wisconsin 113 MMcf of gas per day. This gas is for further development of existing markets already served by Michigan Wisconsin with gas transmitted through the northern system of Midwestern. The Applicant testified that both these contracts were contingent upon the Great Lakes Project. This is clearly so in the case of the sale to Great Lakes, itself, and, although the evidence is not so clear in the case of the Midwestern contract, its result appears to be the same.

Detailed market information supporting the sales to Great Lakes and to Midwestern for resale was supplied by witnesses on behalf of American Natural and its affiliates,

Michigan Consolidated and Michigan Wisconsin.

American Natural stated that its incentive to purchase and market Canadian gas was to enhance the economics of the Great Lakes Project. Its combined systems could be expanded by 300 to 350 MMcf per day. If the Great Lakes Project were not proceeded with, the company, along with its affiliates, could transport gas from other sources to the principal United States market areas under consideration at prices equal to or less than the cost of Canadian gas delivered at Marshfield, Wisconsin.

The Intervenor representing the United States coal interests, opposing the Great Lakes Project, expressed the view that the Project was an invasion of United States coal marketing areas.

#### Conclusions

The evidence in respect of gas markets in the United States was not challenged and the Board accepts the estimates of export markets submitted by the Applicant.

#### Export Prices - Evidence

Both the proposed export contracts, that with Midwestern and that with Great Lakes, provide for prices to be determined by the same two-part rates, in which both the demand and the commodity components escalate at 1 January 1971 and each fifth year thereafter to 1 January

1986, with a minimum monthly bill at 75 per cent load factor. The proposed Great Lakes contract also contains provision for sale to Great Lakes of "Ovrrun service" gas as defined in the contract. Both contracts would have terms of 25 years.

The rates are, in United States currency, as follows:

<u>Period</u>	<u>Demand</u> (\$/Mcf/Month)	<u>Commodity</u> (¢/Mcf)	<u>Average</u> <u>at Minimum</u> <u>Billing Rate</u> (¢/Mcf)
First delivery to 31 December 1970	2.422	19.323	29.938
1 Jan.1971 through 1975	2.706	19.745	31.606
1 Jan.1976 through 1980	2.990	20.117	33.222
1 Jan.1981 through 1985	3.274	20.539	34.889
1 Jan.1986 through remain- ing term of contract	3.559	20.960	36.559

Ovrrun service gas would be billed to Great Lakes at 24¢ per Mcf.

There is a separate letter agreement relating only to the construction period, ending 31 October 1967 under which gas would be supplied to Great Lakes for testing and line fill, to a total of 3 Bcf, at a price of 27.705¢.

Trans-Canada in its submission presented a tabulation to demonstrate that the proposed export sales are at



rates which are in excess of those which a Manitoba Rate Zone distributor, under an equivalent load factor, would be required to pay for similar service. The tabulation indicated that, in comparison with the escalating demand, commodity and average rates payable under the export contract as shown above, converted to Canadian currency at \$1.081, the Canadian distributor would pay non-escalating rates, which would be lower as to demand charge at all stages of the twenty-five year period, higher as to commodity charge until the twenty-first year, and lower on the average (at the 75 per cent load factor assumed) at all stages. In terms of average prices, the comparison is:

<u>Load Factor</u>	<u>Proposed Export</u>	<u>Manitoba Zone</u>
	<u>Contracts</u> (¢/Mcf)	<u>Rates (MD.4)</u> (¢/Mcf)
	75 per cent	75 per cent
First Five Years	32.36	32.15
Second Five Years	34.17	"
Third Five Years	35.92	"
Fourth Five Years	37.72	"
Fifth Five Years	39.52	"
25 Year Average	35.94	32.15

Page 1 of Appendix 21 shows in Canadian currency (at \$1.08) average prices associated with the annual sales volumes forecast by Trans-Canada for the first five years,

and the maximum annual volume for which a licence is sought for the next five years, for the exports to Great Lakes, and page 2 of Appendix 21 shows the average prices associated with the annual volumes to be sold to Midwestern. The effective load factor in the case of Great Lakes rises through the first five years, and is at 100 per cent in the second five years; in the case of Midwestern the effective load factor is about 85 per cent throughout. These load factors, with the comparatively low commodity component in the export price structure, result in anticipated average export prices lower than the Manitoba Rate Zone 75 per cent load factor average price until the fifth year in the case of Midwestern and until the tenth year in the case of Great Lakes. The actual sales contract to the principal Manitoba distributor is at 65 per cent load factor, and if the contracts were compared on a 65 per cent basis the results would make the Manitoba price appear relatively lower, because of the minimum monthly billing floor of 75 per cent in the export contracts.

Page 3 of Appendix 21 illustrates that, at the actual load factors forecast, the export sales would be profitable to Trans-Canada, and hence would make a contribution to its total operations from which its Canadian customers would be expected to benefit.

As previously noted, the witness for American Natural, which will market the gas sold to Midwestern and to Great Lakes for resale, testified that American Natural and its affiliates could secure gas from other sources at prices equal to or less than the cost of Canadian gas delivered to Marshfield, Wisconsin.

The testimony of the Applicant as to export prices was not challenged by intervenors.

Export Prices - Conclusions

In its July 1965 Report the Board found the export price for the proposed sale to Midwestern to be just and reasonable in relation to the public interest. Although the quantities now proposed to be delivered to Midwestern under Licence GL-18 are lower than those under discussion in that Report, nothing in the evidence now before it gives the Board any cause to regret that finding.

In respect of the proposed sales to Great Lakes, the demand and commodity charges for deliveries within the contract quantity are, in the view of the Board, just and reasonable in relation to the public interest. The provision for sales of "Overrun Service" gas at 24¢ per Mcf would be reasonable, in relation to the commodity charge provided in the contract, so long as the proportion of overrun gas was not excessive in relation to the total



deliveries under the contract. Conceivably deliveries could be so arranged between these two affiliated companies as to reduce the average price of gas exported under the contract. Although the Board has no reason to believe that the contract would be operated in such a manner, it would for greater certainty condition any export licence issued for this sale to Great Lakes to provide that Overrun Service gas shall not comprise more than 5 per cent of the volume billed in any year.

The Board finds the price of 27.705¢ (US) for the 3 billion cubic feet to be sold to Great Lakes in 1967 for testing and line fill to be just and reasonable in relation to the public interest.

FacilitiesEvidence

Trans-Canada has applied for a Certificate to construct pipe line facilities in Canada which for the most part would complement those to be constructed in the United States by Great Lakes. The application covers the Canadian facilities required to meet its forecast of market developments for the contract years 1966-67 and 1967-68. The cost of the facilities for these years was estimated to be \$23,558,000 in 1966 and \$60,607,000 in 1967. The details of the facilities are shown in Appendix 2.

In the further development of the 34-inch pipe line system in Western Canada, Trans-Canada proposed to provide additional capacity by completing the first loop line rather than by relying wholly on additional compression. The Applicant wished to complete the second line of pipe west of Winnipeg for reasons of reliability. The relatively large amounts of surplus power proposed at stations west of Winnipeg in certain years were stated to be a result of Trans-Canada's practice of purchasing large capacity gas turbine compressor units.

The Applicant planned to commence the construction of the third line of pipe on its system west of Winnipeg in

1967 and to complete that loop in 1971. Although additional compression would be cheaper in the initial two years, Trans-Canada stated that the completion of the looping would offer greater savings in subsequent years and would be the most economical method of development over the next eight-year period. While it had selected 34-inch diameter pipe and was not applying for the certification of 130 miles to be constructed in 1967, it was making further studies and a final decision as to pipe size could be made later. Trans-Canada stated that the possibility of the construction of a pipe line from Marten Hills, Alberta to connect with the present system at Moosomin, Saskatchewan, would have a bearing on the development of the third line and it was possible that only partial looping would be required between Burstall and Moosomin.

After completion of the Great Lakes line the throughput in the Northern Ontario line and the Great Lakes system respectively would be adjusted to economize on fuel use on the Northern Ontario line. That line is at present operating in the optimal range but, in the initial years following construction of the Great Lakes system, a considerable reduction in throughput would take place. Thereafter it would increase until the optimal level of the system



was again reached.

Deliveries to Southern Ontario through the Northern Ontario line would be progressively decreased as gas sales increase in Northern Ontario. While the capability of the line would be reduced initially by the transfer of the five compressor stations referred to in the present application, Trans-Canada would ultimately increase the capacity of the Northern Ontario line. This would be carried out as necessary to meet the additional requirements of customers in Northern Ontario, by replacement of compressors at some of the five station sites and through line looping. In an emergency, gas could be supplied to some part of Northern Ontario through the Great Lakes system and northward from Maple by reversing the flow through a portion of the line.

The cost of constructing the 34-inch loop line in 1966 and in 1967 was estimated by the Applicant at \$163,000 per mile in Saskatchewan and \$159,000 per mile in Manitoba. These figures compare with estimated 1965 costs of \$147,000 and \$141,000 per mile in Saskatchewan and Manitoba, respectively. The Applicant emphasized that the relatively large increases in estimated future costs were attributable to the "definite increasing trend, particularly in the construction cost".

Trans-Canada stated that no increase had been provided for in the cost of compressor stations similar to that allowed for in the cost of installing pipe, since the company's experience over the last two years has indicated that, although more costly housing and site appurtenances were required at the stations, these had been offset by the lower cost of the portable type compressor units used.

At Lisgar, the main delivery point for the Toronto-Hamilton area, the reserve capabilities of the pipe line system after the proposed 1966 and 1967 construction, in excess of peak day sales requirements are shown in the following table, as are the remaining reserve capabilities assuming the loss of a unit at the critical location.

Time	Reserve Capability MMcf/d	Critical Location	Reserve Capability After Loss of Unit at Critical Location MMcf/d
Winter 1966-67	38	Station 52	-50
Summer 1967	54	" 52	-35
Winter 1967-68	75	" 9	40
Summer 1968	50	" 52	9

Trans-Canada stated that relative to its proposal to move five gas turbine driven compressor units from Ontario to Saskatchewan and Manitoba, that each was valued

at approximately \$1,100,000. The non-recoverable installation cost at each location would be \$317,000. Replacement units would be installed at some of these eastern compressor station sites commencing in about five years. It was estimated that moving the units in this way, rather than leaving them idle, would result in an annual saving of \$110,000 per unit.

The Applicant stated that it had acquired two 6,900-horsepower centrifugal compressor units from Alberta Gas Trunk Line which it proposed to install at its existing Compressor Station No. 2. These units were similar to compressor units at Stations 45, 55, 62, 75 and 86, so spare parts would be available from existing stocks. In reference to the addition of centrifugal units rather than more reciprocating units, it was stated that, whereas the wide fluctuation in gas flows in the early years of operation favoured the reciprocating units, the present higher and steadier flows more nearly matched the optimal operating characteristics of centrifugal compressors.

Trans-Canada was questioned by the Board regarding the installation of an additional 3,000-horsepower electric-motor-driven compressor station on the Toronto-Montreal section of the system since there would appear to be a surplus of capacity at two other stations in the



operating year 1967-68 even without this installation. Trans-Canada stated that the facilities would be necessary to meet the peak-day requirements, including "winter peaking service and other peaking services" in this section of the system.

Trans-Canada stated that the existing right-of-way in Western Canada was 65 feet wide and that an additional 65-foot width of right-of-way from the Saskatchewan-Alberta border to Winnipeg would be required for the third line of pipe. This latter line would be located 25 feet from the existing lines of pipe. Counsel for the Applicant confirmed that it would seek leave of the Board in respect of any expropriation of additional right-of-way required.

The Applicant stated that extra precautions would be taken where soil erosion might be a problem and that additional costs associated with this had been included in the estimates.

The Applicant had selected API 5LX52 pipe for its proposed construction in Canada, whereas Great Lakes had selected API 5LX60 pipe for construction in the United States. It was stated that 5LX60 pipe was not readily available in Canada at the time the estimates were made although it was now becoming available. As there was some price advantage in the use of 5LX60 pipe consideration would

be given by Trans-Canada to its use in 1967.

The pipe to be installed in Canada would be produced by Canadian mills using Canadian steel plate. Taking fittings, valves, coating and wrapping material into account, the average Canadian content of all pipe line material would be of the order of 90 to 95 per cent. For compressor stations and additions thereto the Canadian content would be approximately 80 per cent.

Trans-Canada also presented a summary showing the estimated cost of construction of the Great Lakes system for the first six years of operation. The cost for the year 1966 was \$31,403,000 (US) and in 1967 was \$161,778,000 (US). The estimated cost of 5LX60 pipe to be installed in the Great Lakes system was based upon an average installation cost of \$6.44 per foot and a price for pipe of \$18.53 per foot delivered.

Of the 157 miles of 36-inch pipe to be installed in the Great Lakes portion of the line in the United States, during the first year, approximately one-third would come from Canadian steel mills. This proportion might be increased if more Canadian plate became available. Some proportion of the compressor engines proposed for Great Lakes might also be supplied from Canadian manufacturers but the percentage of Canadian content was not known.

Conclusions

The Board concludes that construction of the Great Lakes Project, as proposed, would provide sufficient capacity to meet the forecast market requirements of Trans-Canada's customers.

Although the evidence indicates that, in the event of failure of a compressor unit at the critical location in 1966-67, there would be a deficiency in system capacity, the Board notes that the peak-day requirements include deliveries of seasonal gas to customers in Southern Ontario which might be interrupted at any time so long as the seasonal volume was delivered within the time specified in the contract. Taking into consideration the system load factor, the Board sees no reason why the Applicant would not be able to fulfill its firm peak-day delivery obligations as well as its seasonal and annual obligations, even if the critical unit were inoperative for several days. In the event of failure of a unit at the critical location in the second year of operation, the reserve capability would be sufficient for the estimated total peak-day requirements.

The Board agrees that it is desirable that Trans-Canada complete the second line of pipe from the Alberta-Saskatchewan border to Winnipeg as soon as possible in order



to increase reliability of service to its customers. This method of increasing capacity to meet the 1966-67 requirements is satisfactory to the Board.

The Board is not convinced that the method proposed by the Applicant for installing additional capacity west of Winnipeg for 1967-68 requirements is optimal. It believes that certification of any facilities for construction in this part of the system in 1967 should be deferred until the further studies being carried out by Trans-Canada have been submitted to and accepted by the Board.

Insofar as deliveries to markets and to storage in Southern Ontario are concerned, there would be advantages in respect of operations and reliability in having separate delivery points in the Sarnia-Dawn area and the Lisgar-Ancaster area, as proposed by Trans-Canada.

The Board agrees that the installation of the additional 3,000-horsepower compressor station would provide greater reliability of service for the eastern end of Trans-Canada's system.

The Board is satisfied with the selection of pipe made to American Petroleum Institute Specification 5LX52 for 1966 construction. For future construction programs the Board believes that further studies should be made of

prices and specifications to determine more precisely any advantages of pipe made to American Petroleum Institute Specification 5LX60.

The Board recognizes the difficulty in making precise estimates of future costs in times of rapidly changing prices. Subject to this qualification, the Board is prepared to accept as reasonable Trans-Canada's estimates for those parts of the project for which approval is not to be deferred, either on Trans-Canada's motion as to the line from Dawn to Ancaster, or on the Board's determination as to 1967 construction west of Winnipeg.

The estimated construction costs of the Great Lakes line are subject to the scrutiny of the FPC. The Board's use of them is for the purposes of comparison.

Cost of TransmissionEvidence

Transportation through the United States portion of the proposed line is covered by a precedent agreement dated 24 September 1965 entered into by Great Lakes, Michigan Wisconsin, Michigan Consolidated and Trans-Canada. Subject to the necessary authorizations being received, Trans-Canada and Great Lakes have undertaken to enter into a gas transportation contract in a form specified by the agreement. (Appendix 3). Under the proposed contract the price payable for transportation of Trans-Canada's gas from Emerson to the St. Clair River would be equivalent, at the 75 per cent load factor provided for in the contract, to 16.13 cents (US) per Mcf. During the first four years of the contract, that is up to 1 November 1970, an alternative basis of payment is available to Trans-Canada whereby the maximum transportation charge would be 13.75 cents (US) per Mcf, provided Trans-Canada's throughput was not less than 90 per cent of the contract quantity to be transported in each of such contract years. Trans-Canada anticipated that its cost of transportation would remain constant at 13.75 cents (US) up to 1 November 1970, a somewhat lower average cost than it otherwise would have to pay.



The tariff for movements of gas through the Great Lakes system would be subject to the jurisdiction of the FPC and it was Trans-Canada's assumption that after 1971 the FPC would require the tariff to be related to the cost of service. This, it was expected, would result in a reduction in rates. For the period 1972 to 1976, on the basis of anticipated throughput and other assumptions, the Applicant estimated the cost at figures which average 12.86 cents (US) per Mcf.

In computing the cost of transmission in the Canadian portion of the overall Trans-Canada system, including Great Lakes, the Applicant took into account operating and maintenance, depreciation, provincial and municipal taxes, a return on a calculated rate base and income taxes. Assumptions used in these matters are detailed in Appendix 14. For the Great Lakes portion of the system the anticipated transportation charges, as estimated above, were used and these were included in the overall cost of transmission. No adjustment to these charges was made in respect of Trans-Canada's share of potential earnings of Great Lakes.

Using these estimated figures, Trans-Canada computed the average cost of transmission from the Alberta border to the various points on the system at which deliveries are made. The unit cost of transmission per 100 miles was also calculated and a further calculation was made to arrive at figures

for the estimated cost of transmission from the Alberta border to what was expected to be the load centre of storage at Dawn and delivery points in Trans-Canada's Central Zone.

Evidence as to the total cost of transmission and the average cost of transmission of gas to various delivery points during the 10-year period commencing 1 November 1966 was provided by the Applicant and this is reproduced in column 2 of Appendices 15 and 16 respectively. The figures show the effect of various rates of return on the cost of transmission. The total cost of transmission (and the average unit cost of transmission) for the first 5-year period and for the 10-year period were estimated to be \$564,751,000 (18.40 cents per Mcf) and \$1,370,884,000 (19.09 cents per Mcf) respectively.

The cost of transmission per Mcf per 100 miles over the same 5-and 10-year periods, estimated at 1.46 cents per Mcf and 1.48 cents per Mcf respectively, is shown in Appendix 17, column 2.

The load centre of storage and delivery points in Trans-Canada's Central Zone was expected to become stabilized within the next few years at around 1,740 miles from the Alberta border. The cost of transmission to the load centre for the 5-year and 10-year periods commencing 1 November 1966 was estimated at 23.01 cents per Mcf and 24.53 cents per Mcf respectively.

### Conclusions

Reference has already been made in this Report to reservations which the Board has in regard to estimated construction costs of the Canadian portion of the Great Lakes Project. In the event of actual costs of construction being significantly different from the estimated costs, in either the Canadian or United States portion of the Project, the cost of transmission could, of course, be materially affected. The cost of transmission in the Great Lakes pipe line is a matter for jurisdiction by the FPC and, in the judgment of the Commission, may be determined at levels higher or lower than those anticipated by Trans-Canada.

The Board also has reservations on a number of other matters entering into Trans-Canada's calculation of the estimated cost of transmission in its system as a whole. For example, Appendix 16 shows the effect on the average cost of transmission of different rates of return. The Applicant argued that an 8 per cent rate of return on its new investments in Canada was necessary from the time of construction, and filed data illustrating the effects of 7.5 and 7 per cent rates of return with a vigorous caveat that such rates were not, in the view of Trans-Canada, adequate. The Great Lakes filing indicates, in respect of



facilities to be installed in the United States, a rate of return rising over several years to a level of 6.5 per cent.

The Applicant submitted that in comparing the rates of return as between Trans-Canada and Great Lakes and their effect on costs it should be taken into consideration that the 8 per cent return postulated by Trans-Canada was associated with rates of depreciation of 2 per cent on pipe and 3.5 per cent on other fixed plant and calculation of income taxes on a flow through basis while, in the case of Great Lakes a 6.5 per cent rate of return was associated with a depreciation rate of 3.5 per cent and calculation of income taxes on a normalized basis.

Since the present proceeding is not a rate case, the Board makes no finding as to the rate of return which would be appropriate on the facilities in Canada, if built, but observes that nothing so far placed on record establishes that an 8 per cent return is required or should be approved by the Board. Its use in this Report for illustrative purposes is without prejudice to any future rate proceeding.

Notwithstanding the reservations referred to, and without by any means accepting all of the assumptions made by Trans-Canada, it appears to the Board that the Applicant's evidence as to cost of transmission is sufficient to enable the Board to find as to the public convenience and necessity of the proposed facilities.

## Financial

### Evidence

Great Lakes would be financed in the United States, except to the extent of Trans-Canada's investment through Alberta Inter-Field in the company's shares. This investment was estimated to total \$17,000,000 US (\$18,377,000 Canadian) within the next two years but no further expenditure by Trans-Canada for this purpose was forecast.

Trans-Canada gave assurance that the 50 per cent interest in Great Lakes would be retained and any change from this situation would be considered as subject to approval of the Board.

Trans-Canada stated that it had already spent on preliminary expenses related to the Great Lakes Project \$1,784,000, a substantial portion of which it hoped in due course to recover from Great Lakes. Certain additional charges associated with what was considered to be excess cost of gas purchases, occasioned by the need to make short-term gas supply arrangements prior to completion of the Great Lakes line, were estimated to total \$7,700,000. It was proposed to amortize these additional costs over a period of approximately ten years at a rate of one-quarter of a cent per Mcf on the gas transported through the Great Lakes system.

As to income that might be received by Trans-Canada from its investment in Great Lakes, an initial dividend was shown as receivable for the year 1972 in the amount of \$1,378,000. A second dividend of \$459,000 was shown as receivable in 1973. No further dividend payments were anticipated during the first 10-year period, and whether or not dividends were paid by Great Lakes thereafter was stated to depend wholly on the policy adopted by that company's management. Cash generated within Great Lakes might instead be reinvested.

Trans-Canada did not look on revenues receivable in respect of its investment in Great Lakes as pipe line revenue, but it recognized that the Board might have a different view.

Trans-Canada's capital expenditures in Canada during 1966 and the succeeding ten years were estimated at \$374,110,000. Financing of 1966 capital expenditures was not expected to present any problem, in view of lines of credit with the company's bankers totalling \$70,000,000. No decision as to long-term financing had been reached but several choices were said to be open to the company, including the issuance of additional bonds, preferred stock, or additional common shares.



Trans-Canada indicated that its policy in selling bonds had been to sell as large a proportion within Canada as the market could absorb. Preferred shares, if issued, would be sold wholly within Canada. Convertible debentures had been sold on a rights basis but only to Canadian shareholders. All equity shares issued since Trans-Canada's initial financing had been sold to Canadian residents. At present, over 90 per cent of Trans-Canada's shares are owned by Canadian residents. Issuance of further common shares at this time was not considered desirable.

#### Conclusions

The Board has no reason to believe that Trans-Canada could not meet its financial commitments in respect of the Great Lakes Project if it were to proceed.

The Board notes the view of Trans-Canada that earnings from its investment in Great Lakes should not be treated as pipe line revenue. For a company which maintains that Great Lakes would in other respects be in effect a looping of its present line through Northern Ontario designed to bring Canadian gas to Canadian consumers by the most economical means, this seems to be a curious position. The Board will be prepared to hear argument on the matter at another time, but nothing herein should be taken to indicate acceptance by the Board of Trans-Canada's proposal in that regard.

EVIDENCE AS TO THE ALTERNATIVE OF AN ALL-CANADIAN ROUTE

Trans-Canada stated that as an alternative to the Great Lakes Project it had considered a number of other possibilities. It had concluded that it could not entrust its ability to carry out its obligation of serving the increasing needs of its Canadian markets to companies in whose policies Trans-Canada had no voice.

Any arrangement to supply Eastern Canada with United States gas by displacement would result in a substantial immediate dilution of Trans-Canada's overall reserves and deliverability. It would also be necessary for the Board to make a determination as to the United States pipe line company's ability to deliver gas to Canada, a function which, in Trans-Canada's view, should not be undertaken by the Board.

It was Trans-Canada's contention that looping of the existing line through Northern Ontario would be more expensive than the proposed Great Lakes Project and the resultant higher cost of transmission would mean a smaller market for gas in Eastern Canada. It was considered that the consequent reduction in throughput would justify only a 30-inch loop, but considerable evidence was given in respect of both a 30-inch and a 36-inch loop through Northern Ontario, which evidence is summarized hereunder.

MarketsCanadian Markets - Evidence

The Applicant contended that if the Great Lakes Project were not built the Canadian sales east of Manitoba as estimated in the application would not be fully realized. On the assumption that a loop line would be constructed through Northern Ontario if Great Lakes were not constructed, Trans-Canada indicated that the total demand in Canada during the ten years to 1976 would be some 11 per cent below the level estimated "with Great Lakes". Of this 11 per cent, slightly less than two percentage points would be accounted for by Sault Ste. Marie, which would not be served with Canadian natural gas. In the case of markets other than Sault Ste. Marie, Trans-Canada attributed the slower market growth forecast to the differential between its current prices and the prices it proposed contingent upon the construction of the Great Lakes line. The rates that might be available to distributors should the Great Lakes Project not be built were not specified, but Trans-Canada suggested that its current rates or higher ones were indicated.

Trans-Canada's forecasts "with Great Lakes" and "without Great Lakes" are shown by area or rate zone through the ten years 1967 to 1976 as follows:



<u>Years 1967-76</u>	<u>With Great Lakes</u> Bcf	<u>Without Great Lakes</u> Bcf	<u>Difference</u> Per Cent
Saskatchewan and Manitoba	791.1	791.1	-
Western Rate Zone	277.1	240.6	13.2
Northern Rate Zone	430.3	389.0	9.6
Sault Ste. Marie	89.8	-	100.0
Central Rate Zone	2,799.0	2,454.0	12.3
Eastern Rate Zone	916.9	865.2	5.6
Unallocated	29.8	15.1	49.3
	<hr/>	<hr/>	<hr/>
Total Sales	5,334.0	4,755.0	10.9
	<hr/>	<hr/>	<hr/>

The distributors endorsed Trans-Canada's forecasts in general terms, although none of them had attempted a detailed analysis of their prospective markets for the full forecast period covered by Trans-Canada.

The forecasts "with Great Lakes" were predicated on an expansion of industrial use by virtue of lower gas costs to the distributors. In the case "without Great Lakes" the additional markets which it had been assumed would develop on the basis of lower prices were eliminated from the calculation.

A contract for gas for industrial use concluded recently between Trans-Canada and Union, known as the C.I.L. contract, provides for a price increase from 43 cents to 45 cents per Mcf after the third year if the Great Lakes Project does not become a reality. Under the contingent "Great Lakes" contract the maximum price quoted by Trans-Canada would be 40.85 cents per Mcf. Union therefore assumed that if Great Lakes does not become a reality there would be a price differential of 4.15 cents per Mcf as far as this sales contract was concerned. Union stated that in these circumstances the additional volumes covered by the contingent Great Lakes contract would not be required. Union expressed the further view that if the price differential between "with Great Lakes" and "without Great Lakes" were only two cents instead of four cents, this would be insufficient to induce a sizable difference in the volumes sold.

Trans-Canada's evidence suggested that a difference of from 1.5 cents to 2 cents may occur in the average cost of transmission per Mcf as between the gas "with Great Lakes" and the gas "without Great Lakes". The Applicant submitted that this difference applied not to the new volumes but to the total volumes of the Trans-Canada system, and

that to the extent that overall economies could be achieved, some of the incremental gas could be sold at a greater reduction than the average.

The distributors participating in the hearing agreed that without Great Lakes there would be little likelihood of any reduction in prices.

The consensus of Trans-Canada and its distributors was that the volumes for domestic and commercial sectors of the market would be essentially the same either "with Great Lakes" or "without Great Lakes". Without such reduction in prices as is proposed by Trans-Canada with its Great Lakes construction, no acceleration would be expected in the development of the industrial sector.

#### Canadian Markets - Conclusions

The Board recognizes that the market in Sault Ste. Marie would not be served in the immediate future with Canadian natural gas if Trans-Canada's pipe line were looped through Northern Ontario, and might eventually have to be served with United States gas, if at all.

As regards other Canadian markets, the Board accepts the view of Trans-Canada and its major distributors, namely, that without price reductions comparable to those offered by Trans-Canada contingent upon the Great Lakes Project, the growth in the industrial market anticipated "with Great Lakes" would not occur, but that the domestic and commercial demand would be little affected by the choice of route.



Export Markets - Evidence

The Applicant contended that the two export markets which it expected to gain under the Great Lakes Project would be lost if the Trans-Canada line were looped through Northern Ontario. These markets are described in an earlier section of this Report.

The first of these markets was related to Trans-Canada's sales of gas to Great Lakes both for fuel and for resale along its route. The Applicant estimated that these sales would rise to some 43 Bcf by 1976 although the maximum annual quantity for which a Licence is requested is 32.1 Bcf. Such sales were shown under a Precedent Agreement dated 24 September 1965 to be contingent on construction of the Great Lakes system.

The second of the markets consisted of the projected sales of gas to Midwestern amounting to 36 Bcf per annum (116 MMcf per day). Although the Precedent Agreement also dated 24 September 1965 between Midwestern and Trans-Canada in respect of these sales did not make them contingent on completion of the Great Lakes Project, the Applicant maintained that this was, in effect, the case. The gas to be purchased by Midwestern, less fuel requirements, was for resale to Michigan Wisconsin, and the agreement in respect of this resale was specifically contingent on Great Lakes. In

view of American Natural's evidence that, failing Great Lakes, Michigan Wisconsin would obtain its gas supply from sources in the United States, the Applicant submitted that Midwestern would, in that event, be unable to demonstrate a market for the gas which it proposed to import into the United States and hence would be unable to obtain FPC approval to do so. Trans-Canada's agreement with Midwestern was contingent on such approval being obtained.

#### Export Markets - Conclusions

The evidence is clear that if, instead of the Great Lakes Project, Trans-Canada's line were to be looped through Northern Ontario, this would have the effect of denying to Trans-Canada the export sales of 32.1 Bcf per annum for 25 years for which a Licence is sought.

In the case of the proposed sales to Midwestern the evidence is not conclusive. On the basis of the agreement between Trans-Canada and Midwestern the export of 36 Bcf per annum was duly authorized under Board Licence GL-18 as amended by Order AO-1-GL-18. The Board agrees that if the Great Lakes Project is not realized the sale to Midwestern might be lost or at least deferred.

FacilitiesEvidence

Trans-Canada presented evidence concerning the additional facilities which would be needed along the route of its present pipe line east of Winnipeg if looping in Canada were carried out instead of the Great Lakes proposal. The studies on this looping were presented as a basis for comparison with the Great Lakes Project. Data for two pipe sizes, 30-inch and 36-inch, were submitted and the costs of transmission for each were developed. The comparative studies are discussed under the heading "Cost of Transmission".

Trans-Canada stated that if the Great Lakes Project were not proceeded with, it would select a 30-inch pipe line for the Northern Ontario looping alternative. This selection was made in the light of the markets which Trans-Canada forecast would be available in the absence of the Great Lakes Project ("low forecast"). For purposes of comparison however, the details of a 36-inch pipe line loop were included. Trans-Canada stated that this line size would be selected if a Canadian market equivalent to that expected with the Great Lakes Project ("high forecast") could become available.

The Applicant agreed that other pipe diameters might be more economical at certain stages of development but believed that the advantages were so marginal that a study of other sizes was unnecessary.



Trans-Canada in its application gave a summary of facilities throughout its system and capital costs which would be associated with each case for an 11-year period. This is recapitulated in the following table:

Summary of Trans-Canada's Estimates  
of Total Capital Expenditures  
Northern Ontario Route

<u>Construction Year</u>	<u>High Forecast 36-inch diameter pipe \$</u>	<u>Low Forecast 30-inch diameter pipe \$</u>
1966	168,291,000	78,801,000
1967	183,386,000	130,116,000
1968	39,704,000	34,623,000
1969	37,709,000	59,202,000
1970	59,231,000	56,101,000
1971	47,948,000	54,510,000
1972	34,564,000	54,243,000
1973	38,776,000	31,132,000
1974	31,095,000	36,097,000
1975	41,435,000	67,146,000
1976	42,761,000	76,529,000
	<hr/>	<hr/>
Total	724,900,000	678,500,000
	<hr/>	<hr/>

The Applicant stated that for the Northern Ontario route it had assumed the pipe line loop would be in the same right of way as the original pipe line. Before adopting this assumption it had examined whether lower costs might result from acquiring additional right of way several hundred feet from the original line in order to decrease the construction costs related to rock blasting. However, its studies had indicated that it would be more economical to construct a loop line on the original right of way because, if the rights of way were separated, longer connecting tie-lines would be required and the new right of way would have to be cleared and graded.

Lakehead Intervenors suggested an alternative looping program from Kenora via Fort Frances to Atikokan and along the north shore of Lake Superior through Sault Ste. Marie and Sudbury to tie into the existing line. Trans-Canada stated that it had made no detailed study of the line but its assessment from a preliminary investigation indicated that the route was not desirable or feasible as "the distance is greater by some 40-odd miles and the terrain is extremely difficult". The Applicant stated that it had studied the possibility of serving the Fort Frances and International Falls area and believed it would be more reasonable to serve this market with a lateral from the existing line. Trans-

Canada also drew attention to the fact that arrangements have been made by Northern and Central to supply natural gas to the town of Atikokan from the present Trans-Canada pipe line.

The Applicant stated that in all the studies on the route through Northern Ontario, it had assumed the use of API 5LX52 pipe. However, if API 5LX60 pipe were substituted for 5LX52 pipe in a 30-inch loop in Northern Ontario, the saving would be \$987 per mile, made up of savings in shipping costs of \$953 per mile and in cost of pipe of \$34 per mile. If 5LX60 pipe were substituted for 5LX52 pipe in a 36-inch looping program there would be a net increase in cost of \$4,160 per mile, which was the result of a saving on shipping of \$397 per mile offset by an increase in cost of pipe of \$4,557 per mile. These costs were based on line pipe manufactured to standard wall thicknesses. The Applicant stated that if the order for pipe were large enough, plate of non-standard wall thickness could be obtained from the steel mills, and that savings by the use of 5LX60 pipe might thereby be achieved in the order of one per cent of the total installed cost.

Trans-Canada stated that the installation cost of \$13 per foot for a 36-inch pipe line in Northern Ontario was an updated cost estimate. The comparable estimate for



a 30-inch pipe line was \$12.10 per foot of which \$7 was for the estimated cost of constructing access roads, for rock excavation and other extra work associated with pipe line construction in that area. These estimates had been determined by reviewing the past costs and the most recent quotations for materials. Looping of the line by several stages spread over several years would involve more move-in and move-out costs than would construction in one stage, and would result in higher unit costs of construction for the pipe line.

The Applicant stated that the average cost per mile of looping with 30-inch pipe between Winnipeg and Toronto, over the period 1967 to 1976, had been estimated at \$195,800 in Ontario and \$191,800 in Manitoba. It was stated that the Manitoba and Ontario estimates were based on a normal rather than an accelerated construction program and Trans-Canada did not have an estimate as to the possible increase in costs if the latter were required. The original cost (1957 and 1958) of the Northern Ontario 30-inch pipe line was stated to be \$162,000 per mile. These figures indicated that there has been an estimated 18 per cent increase in pipe line costs in Manitoba, east of Winnipeg, and an estimated 21 per cent increase in pipe line costs in Ontario, compared with the original pipe line costs.

By contrast, for the cost of partial pipe line loops in Saskatchewan and Manitoba, west of Winnipeg in 1966, only a 10 to 12 per cent increase over the original pipe line costs had been forecast.

The Applicant stated that the expected range of accuracy of the estimates of future cost was plus or minus 3 or 4 per cent. A comparison between Trans-Canada's estimated and actual pipe line construction costs for the past three years was provided in response to a request by the Board. These actual total costs of construction expressed as a percentage of the estimated total costs of construction for the years 1963, 1964 and 1965 were approximately 89, 97 and 105 per cent respectively.

Counsel for the Applicant, in closing argument referred to the reliability of service to consumers that would be afforded by the Great Lakes Project. Since the Great Lakes Project would tie in with another pipe line system there would be mutual support in case of emergency. In addition, there was further advantage in that the line would pass near, and have interconnection with, gas storage areas in Michigan and Ontario. It was further emphasized that completion of the Great Lakes Project would provide full reliability of a complete second line within two years, whereas looping of the line in Northern Ontario would not be completed for eight years.

### Conclusions

The Board has reviewed the route along the north shore of Lake Superior suggested by the Lakehead Intervenors which would require the construction of a complete loop from near Kenora to Sudbury in a single season, with large capital investment by Trans-Canada, by a route somewhat longer and with somewhat more rock than the present route. The Board recognizes the desirability of natural gas being made available to communities along this proposed alternate route, but such service must be on an economic basis. The Applicant considers the proposal to be infeasible and nothing in the evidence or otherwise within the knowledge of the Board at this time supports the contrary view.

Within the premises as to throughput, the Board finds that the alternative looping programs in Northern Ontario for 30-inch and 36-inch diameter pipe line, presented as the basis for the cost of transmission studies submitted by Trans-Canada, are reasonable for that purpose.

The Board notes that if Trans-Canada's estimates of cost for 5LX60 pipe, delivered to stockpiles along the Northern route, are correct, the delivered cost per ton would be approximately 16 per cent higher than for delivery of 5LX60 pipe to stockpiles along the route of Great Lakes in the United States.



Trans-Canada stated that it would be possible to purchase 5LX60 pipe, manufactured to a special reduced wall thickness, to match the maximum allowable operating pressure of the existing pipe line. Calculations show that there could be a reduction of approximately 5 per cent in the delivered cost per foot of such pipe compared to that having a standard wall thickness (used by Trans-Canada in its comparisons).

The percentage increase in the cost of looping compared to original costs has been estimated by Trans-Canada to be much greater in Northern Ontario than in Western Canada. Trans-Canada estimates of costs of looping in Western Canada for the years 1963-64-65 proved to be between 5 per cent lower and 11 per cent higher than the actual costs of construction. Although it is recognized that future construction costs of either the Great Lakes Project or a Northern Ontario alternate pipe line would depend on conditions prevailing at the time of construction, the Board believes that the total costs of construction in Northern Ontario, in relation to those estimated for the Great Lakes Project, could be lower than those estimated by Trans-Canada, by as much as 5 per cent.

Cost of TransmissionEvidence

Evidence in regard to the cost of transmission, assuming looping along the route of Trans-Canada's existing pipe line through Northern Ontario, was provided by the Applicant in a form basically similar to that used in support of the Great Lakes Project. These estimates were made both for a 36-inch and for a 30-inch pipe line and, in each instance, cost of transmission was computed under conditions of "high forecast" and "low forecast" sales. Summary data in this connection appear in Appendices 15, 16 and 17, columns 3, 4, 5 and 6. Where a column number is used in the following paragraphs the reference is to each of the Appendices unless otherwise indicated.

The calculations provided by the Applicant as to transmission costs for the Great Lakes Project (column 2) and for the "without Great Lakes" alternatives (columns 3, 4, 5 and 6) assumed an 8 per cent rate of return on facilities installed in Canada. Comparable data were provided by the Applicant, reflecting a 7-1/2 and a 7 per cent rate of return for the Great Lakes Project (column 2) and "without Great Lakes, low forecast, 30-inch loop" assumption (column 6). Column 4, which relates to the "without Great Lakes, high forecast, 36-inch loop"

assumption was completed, as to the 7-1/2 per cent and 7 per cent rates of return by the Board, using Trans-Canada's basic data.

Trans-Canada's evidence indicates that, in the case of an all Canadian alternative, the 36-inch loop would be appropriate if the "high forecast" sales could be realized but for the "low forecast" sales which Trans-Canada indicated to be more likely, a 30-inch loop would be its choice. Consequently, the following summary of the evidence is restricted to the "without Great Lakes, high forecast, 36-inch loop" assumption and the "without Great Lakes, low forecast, 30-inch loop" assumption.

As shown in column 3 of Appendices 15 and 16, with construction of a 36-inch loop and "high forecast" sales and assuming an 8 per cent rate of return, the total cost of transmission (and the average unit cost of transmission), for the first five years and the first ten years, are estimated to be \$592,648,000 (21.48 cents per Mcf) and \$1,376,742,000 (21.37 cents per Mcf) respectively. With the 30-inch loop and "low forecast" sales the respective costs are estimated at \$521,488,000 (20.58 cents per Mcf) and \$1,253,270,000 (21.07 cents per Mcf), as shown in column 6.

Columns 3 and 6 of Appendix 17 show respectively



the average cost of transmission per commodity mile for the same 36-inch loop "high forecast" sales and 30-inch loop "low forecast" sales alternatives. For the 36-inch loop, the weighted average cost of transmission per Mcf per 100 miles was estimated at 1.511 cents and 1.478 cents for the first five years and the first ten years respectively. The corresponding figures for the 30-inch loop were 1.507 cents and 1.514 cents.

Assuming "high forecast" sales, Trans-Canada expected that the load centre of storage and delivery points in Trans-Canada's Central Zone, after a few years, would be around 1,930 miles from the Alberta border and estimated that, with a 36-inch loop, the cost of transmission to the load centre for the five-year and ten-year periods would be 27.57 cents and 27.74 cents per Mcf.

With the assumption of "low forecast" sales, the load centre after the initial years, was expected to be around 1,870 miles from the Alberta border. With a 30-inch loop, the cost of transmission to the load centre for the five-year and ten-year periods was estimated at 26.58 cents and 27.50 cents per Mcf.

Trans-Canada stated that "on the basis of the volumes we believe will go through Northern Ontario if Great Lakes isn't certificated, we have a lower market and we have

selected a 30-inch line". While acknowledging that a 36-inch loop would be more economical in the long term the Applicant stated that the cumulative investment for a 30-inch line, under the "low forecast" sales assumption would be lower than for a 36-inch line until sometime around 1977. The Applicant stated further that "the cumulative investment favours the 30-inch loop for such a period of time that it would not be prudent to make the higher investment required for the 36-inch loop".

Trans-Canada stated that, among other techniques employed by it in assessing the Great Lakes Project, it had used a discounted cash flow method. This method had been employed only in cases where it had been considered appropriate. These studies were said to be not in a form suitable for filing, and were not filed.

Trans-Canada was questioned as to which of the various methods of computing the cost of transmission was, in its opinion, most relevant for purposes of comparing the relative cost of transportation with the Great Lakes system in operation and, as an alternative, with a loop through Northern Ontario. Use of the "commodity mile" method, measured as the average cost per 100 Mcf miles, was stated by Trans-Canada to be in its view inappropriate because of the different distances covered by the two

alternative routes under consideration. Where a single pipe line was involved or similar routes were under discussion, however, it suggested that this method might have value. Trans-Canada expressed the view that comparison of average costs on a system-wide basis would be useful in comparing different methods of serving almost identical markets. In this particular instance, however, where different pipe line systems with different distances to a market area were being compared, the third method; comparison of the average cost of transmission to the load centre of storage at Dawn and delivery points in the Central Zone, was considered by Trans-Canada to be the most appropriate.

#### Board Study

The Board has had regard for the views expressed by Trans-Canada as to the most appropriate method of comparing the relative costs of transmission with and without Great Lakes. Comparison of the average cost of transmission to the load centre of a pipe line system might, in certain circumstances, be appropriate. In Trans-Canada's application, however, the load centre used was the load centre of only part of the system, namely, Trans-Canada's Central Zone, including Dawn storage. While this area represents a large proportion of Trans-Canada's Canadian market, the Board believes that its other Canadian sales should be taken into



account when assessing the relative merits of alternative methods of radically increasing the capacity of the system. The Board, accordingly, cannot agree with Trans-Canada's submission that the data submitted in regard to cost of transmission to the load centre of the storage areas and delivery points in the Central Zone establish the relative cost of transmission with and without Great Lakes. Another difficulty inherent in Trans-Canada's method of computing "commodity miles" and "load centres", is that two different systems of reference were used to arrive at these figures. In the Great Lakes Project, gas would flow in two different branches of the system with different mileages to the same delivery points. Commodity miles computed for the Great Lakes Project are not readily comparable with commodity miles computed along Trans-Canada's existing route. Consequently, the cost per Mcf per 100 miles that appears in column 2 of Appendix 17 cannot usefully be compared with the other columns of Appendix 17.

The Board believes, for the reasons stated above and others which will be discussed in greater detail, that certain adjustments should be made to the figures as submitted by Trans-Canada in order to permit more valid comparisons of the cost of transmission between "with Great Lakes" and "without Great Lakes" on both the high and low

sales forecast assumptions.

Common to all the methods of comparison shown in Appendices 15, 16 and 17, is the additional variable of the rate of return, which has an important bearing on total costs and on relative costs to the extent that the different proposals involve varying capital expenditures. Trans-Canada has postulated an 8 per cent rate of return from the outset for the facilities to be installed in Canada if Great Lakes were not built, whereas the Great Lakes application now before United States authorities postulates a 6.5 per cent rate of return, to be reached only after several years. This Board's procedures, unlike those of the Federal Power Commission, do not at present involve setting rates of return allowable on facilities at the time of certification, and the Board has not yet determined, as it will by public hearing in due course, the maximum rate of return to which Trans-Canada may justly and reasonably be entitled. Notwithstanding the many differences in the financial and accounting aspects of the two schemes, (for example, depreciation rates and income tax treatment), it is the Board's opinion that the margin of 1.5 percentage points between the rate of return expected on facilities proposed to be installed in the United States and that expected on substantially equivalent facilities installed in Canada appears to exceed the historic margin as between the

rates of return required to attract capital in the United States and those required for similar enterprises in Canada. A margin of one percentage point would be more nearly normal and the Board has, therefore, chosen to use a rate of 7.5 per cent in Canada for the purpose of making its concluding comparative studies. It must be emphasized that the use of any such rate is, of course, without prejudice to the future positions of both the Board and Trans-Canada in any rate proceeding.

The Board's comparisons of the "with Great Lakes" and "without Great Lakes" cases are found in Appendices 18, 19 and 20. Appendix 18 shows the total cost of transmission for the period 1967 to 1976 for the Great Lakes Project and for the "without Great Lakes high forecast" alternative. Appendix 19 shows the same estimates of cost expressed in cents per Mcf. Appendix 20 shows the cost of transmission expressed in cents per Mcf per 100 miles for the Great Lakes Project, the "without Great Lakes high forecast" case and the "without Great Lakes low forecast" case.

In assessing the merits of the Great Lakes Project as compared with the "without Great Lakes" alternatives, one of the Board's main concerns must be the effect on Canadian consumers.

In order to provide a valid comparison, the Board has made certain adjustments to the cost data submitted by



Trans-Canada for the "with Great Lakes" case. Trans-Canada's data, shown in column 2 of Appendices 18, 19 and 20, has been adjusted to yield the figures shown in column 3 of each of these Appendices. A description of the adjustments and of the reasons for them follows.

As a first step, at least, it is necessary to compare the costs of serving identical markets. The Board has, therefore, deemed it appropriate to deduct from the Great Lakes Project, both the volumes of exports contingent upon the approval of the Great Lakes Project and the sales to Sault Ste. Marie. This reduces the sales in the "with Great Lakes" case to the same sales as in the "without Great Lakes, high forecast" assumption. In making the deduction, it is also necessary to adjust the cost of transmission under the Great Lakes Project so as to eliminate therefrom the cost of moving gas for the contingent exports and for Sault Ste. Marie sales from Burstall to Emerson. The cost of moving the Sault Ste. Marie sales volumes from Emerson to Sault Ste. Marie, included in Great Lakes total transportation charge to Trans-Canada, has also been deducted to reflect Trans-Canada's transportation costs in the absence of the Sault Ste. Marie market.

In computing the cost of moving the volume of gas for the contingent exports and Sault Ste. Marie sales from Burstall to Emerson, the Board has used Trans-Canada's cost

estimate of moving all gas from Burstall to Winnipeg for 1971 (the only year for which this cost was given), and assumed that annual variations in this cost would correspond to the variations in the overall cost of transmission in the other years. The details of this adjustment are presented in the notes to Appendix 18.

During the first two years of the Great Lakes Project gas would be purchased from Michigan Wisconsin at Austin and imported at the St. Clair River. The only portion of the costs of this gas included by Trans-Canada in its cost of transmission computations has been the cost of transportation from Austin to the St. Clair River. In the "without Great Lakes" cases, facilities were designed and appropriate transmission costs were included to move the same amount of gas from Burstall to Eastern Canada. In order to ensure a valid comparison, it is, therefore, necessary to include in the adjustment of the transmission cost of the Great Lakes Project, the price differential between Burstall and Austin which is equivalent to the cost of transmission associated with this gas imported at the St. Clair River. This additional cost for import of some 75 Bcf amounts to some 19 million dollars as explained in Appendix 22.

The adjustments for all contingent sales, including

those offsetting the purchases at Austin, have been included in the adjusted transmission costs shown in column 3 of Appendices 18, 19 and 20.

It should be noted that the import of gas purchased from Michigan Wisconsin in the first two years would be subject to an import duty of 3 cents per Mcf, amounting to some 2.2 million dollars. This cost, and additional like costs which could be considered attributable to the implementation of the Great Lakes Project, have been taken into account in Trans-Canada's cost of transmission estimate of the "with Great Lakes" case by inclusion of an "amortization" charge of one quarter of a cent per Mcf for gas moved on behalf of Trans-Canada through the Great Lakes line until such costs are fully offset. This charge amounts to 5.7 million dollars over the ten-year period under study and, for purposes of this study, has been considered as offsetting the duty on the imports at St. Clair River, plus other costs mentioned by the Applicant but for which no details were given. The Board, therefore, has made no further adjustment to the cost of transmission in column 3 of Appendices 18, 19 and 20, in respect of the duty on imports in the first two years.

In comparing the "with Great Lakes" case, as



adjusted by the Board, with the "without Great Lakes, high forecast", it is sufficient to refer to the total costs of transmission shown in columns 3 and 4 of Appendix 18, since sales are identical. Columns 3 and 4 of Appendix 19, give the same comparison, expressed in terms of cents per Mcf.

The Board found that in order to provide a basis for comparing the 30-inch line "without Great Lakes, low forecast" case with the 36-inch line in the "with Great Lakes" and "without Great Lakes, high forecast" cases it was necessary to use commodity mile costs of transmission. In its opinion, average cost of transportation per Mcf would not provide a meaningful comparison because both the sales volumes and average hauls are different. If the average haul is halved, or doubled, all other factors remaining constant, then the average cost per Mcf is accordingly halved or doubled. The cost per Mcf, divided by the average haul, or cost per commodity mile is, however, expected to yield a reliable method of comparison, independent of variations in sales pattern and average haul along the same pipe line route.

When cost per commodity mile comparisons are to be made between two alternatives affecting the same customers, the commodity miles should be computed along

the same route. If commodity miles are computed along different routes, as was done in the Trans-Canada application, then the resulting costs per commodity miles are not readily comparable.

In order to make a valid comparison of the "with Great Lakes" case as adjusted by the Board and the "without Great Lakes" cases, the Board felt justified in using the mileage for the Northern Ontario route in computing commodity miles for the three cases to be compared. This was because the average commodity mile costs calculated on this basis for the "with Great Lakes - adjusted" and the "without Great Lakes, high forecast" cases, (both using a 36-inch line, with identical sales) reflect the same percentage difference shown by the estimated total costs of transmission for the same time period. (These comparisons are discussed under the heading "Conclusions" in this section). The costs of transmission per Mcf per 100 miles for each of the "with Great Lakes - adjusted", the "without Great Lakes, high forecast" and the "without Great Lakes, low forecast" cases are shown in Appendix 20, columns 3, 4 and 5 respectively.

In Appendices 18, 19 and 20, the Board, in making the adjustment in respect of cost of transmission of gas

for exports said to be contingent on Great Lakes, recognized two benefits to Canadian customers from these exports. To the extent that exports take place which would not otherwise materialize, the additional volumes of gas transported in the system between the Alberta-Saskatchewan border and Winnipeg would make a contribution to the cost of moving the other gas. This benefit is retained in calculating the figures shown in column 3 of Appendices 18, 19 and 20. However, a benefit to Canadian customers which has not been included in the cost of transportation calculations by either Trans-Canada or the Board is Trans-Canada's profit on these export sales. This profit has been estimated by the Board to be approximately 27.6 million dollars over the next ten years assuming a 7-1/2 per cent rate of return in computing the cost of moving this gas to Emerson. Details are shown in Appendix 21.

Additional studies of the costs of transmission on "with Great Lakes" and "without Great Lakes" basis were carried out by the Board using its computer programs and employing discounting techniques. These studies generally confirm the results which are shown in Appendices 18, 19 and 20. They also reveal the high sensitivity of the differential in transmission costs to variations in the



estimates of certain key variables, such as construction costs, rates of return, depreciation rates and tax treatment.

### Conclusions

In comparing the total cost of transmission for the "Great Lakes - adjusted", and the "without Great Lakes, high forecast" costs respectively, shown in columns 3 and 4 of Appendix 18, it will be noted that a 30 million dollar saving (5 per cent) in transmission cost, over the first five years, is indicated in favour of Great Lakes. This reflects the low transportation charge fixed for the first four years in the proposed contract between Great Lakes and Trans-Canada. The total transmission cost, over the next five years, indicates a saving in favour of "without Great Lakes, high forecast" in the order of 16 million dollars. In part, this appears to be due to higher income tax payments on the Canadian operations associated with the Great Lakes Project. The ten-year comparison indicates an advantage of approximately 14 million dollars or 1 per cent on the total transmission cost in favour of Great Lakes.

A comparison of columns 3 and 4 of Appendix 19 necessarily confirms the previous comparison in Appendix 18. The average cost of transmission over the next five years

indicates an advantage of 5 per cent in favour of the Great Lakes Project. Over the ten-year period the advantage would be 1 per cent in favour of the Great Lakes Project.

As mentioned previously, the main purpose of Appendix 20 is to provide the basis of comparison for the three cases, "with Great Lakes - adjusted", "without Great Lakes, high forecast, 36-inch line", and "without Great Lakes, low forecast, 30-inch line". It will be noted from Appendix 20 when comparing the "with Great Lakes - adjusted" (column 3) and "without Great Lakes, high forecast" (column 4) that the weighted average commodity mile costs for the first five years and for the ten-year period indicate the same percentage differences in favour of "with Great Lakes - adjusted", namely, 5 per cent and 1 per cent, as shown in Appendices 18 and 19, thus verifying the use of the northern route mileage for comparative purposes.

The following is a comparison of the three cases (Appendix 20, columns 3, 4 and 5) on a commodity mile basis ( $\text{¢/Mcf/100 miles}$ ):

	<u>With Great Lakes - Adjusted</u>	<u>Without Great Lakes High Forecast 36-inch line</u>	<u>Without Great Lakes Low Forecast 30-inch line</u>
First five years Weighted average	1.381	1.456	1.454
Second five years Weighted average	1.331	1.301	1.382
Ten-year weight- ed average	1.352	1.367	1.412

The tabulation demonstrates that for the first five years the "with Great Lakes - adjusted" case has a 5 per cent transmission cost advantage over both the "without Great Lakes, high forecast, 36-inch line" case and the "without Great Lakes, low forecast, 30-inch line" case. Over the ten-year period the "with Great Lakes - adjusted" case has a cost advantage of 1 per cent over the "without Great Lakes, high forecast, 36-inch line" and a 4 per cent advantage over the "without Great Lakes, low forecast, 30-inch line".

It will be observed that in the two cases involving looping in Northern Ontario there is a commodity mile cost advantage of 3 per cent over the ten-year period for the "without Great Lakes, high forecast, 36-inch line" over the "without Great Lakes, low forecast, 30-inch line" while the costs for the first five years are approximately the same.



Trans-Canada agreed that a 36-inch line loop would provide lower transmission costs in the long term. Central to Trans-Canada's case, however, was the premise that the Great Lakes Project offered the best, if not the only, means of reducing the cost of transmitting gas in the immediate future, and thus lowering the price of future gas sales. The Applicant took the position that with its present 30-inch line through Ontario it was not earning an excessive rate of return and that looping with a 30-inch line would not make possible any reduction in rates. It had examined the possibility of looping with a 36-inch line but had come to the conclusion that in order to finance the 351 million dollar investment required before 1 November 1967 as compared with 211 million dollars for a 30-inch line, it would have to obtain contracts from the distributors for their growth requirements over several years in order to determine feasibility. Under present rates, the distributors so far had been prepared only to contract for gas on a year-to-year basis. The Applicant did not feel it would be able to offer the distributors the same rates as it had, contingent upon the Great Lakes Project being approved, because "a reduction in transmission cost requires either a shorter transport distance or a larger diameter pipeline". The Great Lakes Project

offered both these advantages and, in addition, special transportation rates which would enable Trans-Canada "to get over the hump of the short term" as the Great Lakes Project had under contract sufficient volumes to make it economically feasible in its fifth year of operation.

The Board's comparison of the cost associated with the "Great Lakes - adjusted" case and the "without Great Lakes, high forecast, 36-inch" case supports Trans-Canada's contention that in the short term (five years) the Great Lakes Project offers a transmission cost advantage, though not as great as that postulated by Trans-Canada. Trans-Canada indicated, assuming a 7-1/2 per cent rate of return, an average saving in cost of transmission over the first five years of 2.8 cents per Mcf or 13.5 per cent, while the Board's "Great Lakes - adjusted" case shows a saving of 1.08 cents per Mcf or 5 per cent.

Over a ten-year period Trans-Canada's figures indicate an average saving of 1.62 cents per Mcf or 8 per cent for the Great Lakes Project in cost of transmission as compared with the "without Great Lakes, high forecast, 36-inch line", while the Board's "Great Lakes - adjusted" case shows a saving of 0.22 cents per Mcf or 1 per cent.

The Board appreciates the importance of reducing the transportation cost of gas to the Ontario and Quebec markets to enable additional sales to be realized, especially in the industrial sector. It agrees that the only way this can be achieved is by the use of a larger diameter line with sufficient throughput to make it viable. The Board's studies indicate that looping with a 30-inch line as compared with a 36-inch line - assuming 10 per cent higher throughput through the 36-inch line - offers savings in the first two years but in subsequent years the cost of transmission is higher. As previously mentioned, the weighted average transmission cost per commodity mile for the first five years is about the same. Over a ten-year period the average cost shows a 3 per cent difference in favour of the 36-inch line.

Trans-Canada, as a result of its studies, concluded that if the Great Lakes Project were not approved, it would start to loop with a 30-inch line because of its inability to finance the much larger capital costs associated with a 36-inch line looping program in the absence of firm contracts from the distributors covering sufficient volumes of additional gas to demonstrate the feasibility of a 36-inch looping program. As stated



previously, the Applicant did not feel it could quote sufficiently attractive prices to the distributors to obtain the requisite sales contracts.

The Board believes that Trans-Canada's cost estimate for looping in Northern Ontario may be on the high side. If this were so, the costs of transmission for the "without Great Lakes", alternatives would be reduced. For example, if the total construction costs, including the cost of pipe for the 36-inch loop, estimated to total 305 million dollars for the first five years, were reduced by 5 per cent, there would be a saving in the cost of transmission in that period of approximately 7 million dollars. Taking into account the same five-year reduction in capital costs, as it affects the cost of transmission over the ten-year period, there would be a saving of some 14 million dollars. A further modest reduction in transmission costs could be achieved by sand-blasting the original 30-inch line as the looping program progressed.

On the other hand, the Board has not taken into consideration the profits on the contingent export sales associated with the Great Lakes project which would be credited against transmission costs for rate-making purposes.

In the first five years these would apparently amount to some 13 million dollars and over the ten-year period about 30 million dollars.

The Board is well aware of the uncertainties involved in these comparative studies in areas associated with line design, estimated cost of construction, interest rates, rates of return and depreciation rates. The comparisons have been made between a situation in which the major part of the proposed construction would take place in the United States, financed by a separate company in which Trans-Canada, through a subsidiary company, would have only a half interest, and a situation in which the expansion of facilities would take place wholly within Trans-Canada's existing system in Canada. The Board recognizes that the facilities of Great Lakes would be regulated by the Federal Power Commission and that actual conditions may vary from those assumed by Trans-Canada.

All things considered, the Board believes that the estimated savings shown for the "Great Lakes - adjusted" case over the "without Great Lakes" alternatives are reasonable indications of the advantage of the Great Lakes Project from a cost of transmission point of view. There would appear to be savings in favour of the "Great

Lakes - adjusted" case of 5 per cent over the first five years and 1 per cent over the ten-year period when compared with the "without Great Lakes, high forecast, 36-inch line" case. There would be savings of 5 per cent and 4 per cent, respectively, in favour of the "Great Lakes - adjusted" case when compared with the "without Great Lakes, low forecast, 30-inch line" case.



## Financial

### Evidence

Trans-Canada did not indicate what method of financing would be used in the event that the existing line through Northern Ontario was looped rather than the Great Lakes pipe line being constructed. While it was not Trans-Canada's position that a loop through Northern Ontario could not be financed, such financing was considered to be a major undertaking, a prerequisite of which would be major contracts with Trans-Canada's customers. Such contracts, in turn, would be dependent on the customers' willingness to enter into long-term agreements at the prices necessary to sustain the Project.

### Conclusions

The Board accepts Trans-Canada's statements as to the relative difficulty of financing a loop of the existing line through Northern Ontario as compared with the financing of the Great Lakes Project. However, the Board has no reason to believe that such a loop could not be financed.



REASONS FOR DECISIONSummary of Foregoing Conclusions

In Sections 4 and 5 of this Report, the Board has set forth its estimates and findings on various matters in the context of the discussion relevant to them. Having estimated that as of 31 December 1965 established natural gas reserves for Canada were 44.6 Tcf of which 37.4 Tcf were available, the Board has found Canadian requirements to be met from such reserves to total 23.1 Tcf, requirements to meet existing export Licences 10.4 Tcf, and, after deducting the 0.8 Tcf requested in the present export application, the Board has concluded that there is a current surplus of 4.9 Tcf. It has further estimated the future surplus at 13.8 Tcf. In respect of Trans-Canada's reserves and deliverability, while certain deficiencies therein are apparent, the Board is confident that Trans-Canada can and will contract for the additional gas reserves necessary to offset these deficiencies.

The Board has estimated that Canadian requirements over the 30-year period 1966-1995 would be 46.6 Tcf, which is 1.7 Tcf more than estimated by the Applicant. The Board accepted the estimates of the Applicant as to the markets to be served under the export Licences related to this application, and found that the price associated with the proposed exports



to Great Lakes was just and reasonable in relation to the public interest. It had previously so found in relation to the proposed exports to Midwestern (July 1965 Report and GL-18).

With regard to facilities, the Board has found that construction of the Great Lakes Project, as proposed, would provide sufficient capacity to meet the forecast requirements of Trans-Canada's customers. The Board has found that Trans-Canada's 1966 facilities program, including the completion of the second line of pipe from the Alberta-Saskatchewan border to Winnipeg, is urgently required to meet the 1966-67 requirements of its customers and to increase the reliability of service; and has by Interim Report signified its willingness to issue a Certificate in respect of the facilities proposed for construction in 1966, and, having received the approval of the Governor in Council, has issued Certificate of Public Convenience and Necessity No. GC-29 dated 26 July 1966. (See Appendix 23 for Interim Report.)

The Board is also prepared, subject to certain conditions, to certify the public convenience and necessity of facilities proposed by Trans-Canada for 1967 construction. While accepting 5LX52 pipe for 1966 construction, and provisionally for subsequent construction, the Board believes

that further investigation should be made of the possible advantages of using 5LX60 pipe in 1967 and later years. It will therefore require as a condition to certification of the 1967 construction program that, before 1 February 1967, Trans-Canada submit for the Board's approval, plans and specifications of the facilities to be constructed during that year.

As to cost of transmission in the system with the addition of the proposed facilities, the Board has concluded, notwithstanding certain reservations and without accepting all the assumptions made by Trans-Canada, that the evidence is sufficient to enable the Board to find as to the public convenience and necessity of the proposed facilities.

On the evidence before it, the Board has no reason to believe that Trans-Canada could not meet its financial commitments in respect of the Great Lakes Project if it were to proceed.

The Board has also given consideration to the circumstances which would arise, if the Great Lakes Project were not to proceed, but if instead the requirements of Trans-Canada's customers in Canada were to be met by the addition of facilities along the existing route of Trans-Canada through Northern Ontario. The Board also considered the possibility, raised for consideration by the Lakehead Intervenors, that a different route through Northern Ontario

should be followed, but concluded that it must agree with Trans-Canada that such a route appears under existing circumstances to be economically unattractive.

On the postulate of a loop of Trans-Canada's present line, the Board recognized that such a choice would mean that Sault Ste. Marie would not be served with Canadian gas, at least for the time being, and accepted the view of Trans-Canada and the distributors that, without price reductions comparable to those offered by Trans-Canada contingent upon the Great Lakes Project, the growth in the industrial market anticipated with Great Lakes would not occur, although the domestic and commercial markets would be little affected by the choice of route. Export sales to Great Lakes, amounting to some 32.1 Bcf per annum by 1976, would be lost, as might those to Mid-western under GL-18, amounting to some 36 Bcf per annum. Such a loss would not however be permanent, in the sense that the gas would never be produced; rather it would mean that either Trans-Canada or some other purchaser would have an opportunity to contract for the purchase of this gas for either Canadian or export markets.

As to facilities in the case of a loop through Northern Ontario, the looping programs based on 36-inch and 30-inch pipe which were submitted by Trans-Canada were found



by the Board to be generally reasonable in terms of design, subject to possible savings through the use of 5LX60 pipe, but the Board believes that the costs of construction in Northern Ontario, in relation to those set forth for the Great Lakes line, could be lower than those estimated by Trans-Canada by as much as 5 per cent.

When the Board considered cost of transmission, it concluded that the estimated savings shown for the "Great Lakes - adjusted" case over the "without Great Lakes" alternatives are reasonable indications of the advantage of the Great Lakes Project from a cost of transmission point of view; that there would appear to be savings in favour of the "Great Lakes - adjusted" case of 5 per cent over the first five years and 1 per cent over the ten-year period when compared with the "without Great Lakes, high forecast, 36-inch line" case; and that there would be savings of 5 per cent and 4 per cent in favour of the "Great Lakes - adjusted" case when compared with the "without Great Lakes, low forecast, 30-inch line" case.

#### Public Interest

Other aspects of the public interest, some of which have been touched upon in previous parts of this Report, require further consideration in the light of the Board's statutory responsibilities. Some of the grounds to

which the Board may have regard, in considering applications for Certificates and Licences, are specified in the statute, and in this context the language of paragraph (e) of Section 44 is particularly relevant, i.e. "any public interest that in the Board's opinion may be affected by the granting or refusing of the application". The Board is also charged broadly to "take into account all such matters as to it appear relevant" in considering Certificate applications, and to "have regard to all considerations that appear to it to be relevant" to an application for an export Licence.

The Great Lakes Project is unusual if not unique in the concept of integrated international operation which underlies it and which is untested and open to question in various aspects. Completion of the Project would require, aside from Certificate and Licence authorization by this Board, authorization from the FPC for construction and operation of the portion of the pipe line in the United States, for the import and export of gas in the manner proposed, and for carrying out the contracts entered into in this connection by Trans-Canada with Great Lakes and various other United States corporations. The Board's view that the Project is economically and financially feasible is contingent upon the FPC issuing substantially those authorizations applied for by Great Lakes. If this Board were to

issue the Certificates and Licences applied for by Trans-Canada, they would have to be conditioned upon the subsequent issue of corresponding authorizations by the FPC. In particular, whatever economic advantage the Great Lakes Project may have from the viewpoint of Canadian consumers is dependent on the transportation contract between Trans-Canada and Great Lakes being approved and carried out in substantially its proposed form and at the proposed rates. This aspect of the matter is however one on which the Board could only await the decision of the FPC, which will be reached in due course by that Commission quite independently of this Board's views, within the framework of the relevant United States laws, regulations and rules of procedure, and upon the record before that Commission.

The international nature of the Project raises some deeper questions than this. Perhaps the first is whether the Project can be reconciled in principle with historic Canadian policy in respect of natural gas pipelines. This policy developed as it became clear in the early 1950's that Canada might have supplies of gas in excess of the requirements of the provinces where it was produced, and that export markets might be available for such surpluses. The general theme, as enunciated, for example, by the Minister of Trade and Commerce in the House of Commons on



13 May 1953, was that gas should not be committed for export until supplies had been assured for those Canadian markets to which gas could be economically transmitted. Trans-Canada was founded and developed within this policy, and, consistently with it, developed its original system to provide service to the population concentrations in Southern Ontario and the Montreal area by means of an "All-Canadian" line through Northern Ontario. While Trans-Canada never deviated from its proposal to build its original system entirely within Canada, many observers and proponents of other gas transmission projects considered it economically infeasible, and, as is well known, the Government of Canada found it necessary in 1956 to make certain short-term loans to Trans-Canada, and to build and own for some years that portion of the original 30-inch line between the Manitoba border and Kapuskasing in Ontario. The loans were repaid and the Crown section purchased by Trans-Canada within the time periods contemplated in the agreements, and at no financial cost to the Crown. Once the initial reluctance of the financial community to support the "All-Canadian" project was overcome by this use of Crown credit, the venture was able to build its business and credit rating to the point where it is now earning a return slightly in excess of 7 per cent, and has been able to raise

additional capital as required for expansion without abnormal difficulty. The project involved, from 1954 onwards, a proposal to export gas at Emerson, as well as service to Ontario and Quebec customers. While such export was regarded by the financial community as important to the viability of the project, and was approved in principle by the Government of the day in 1955, subject to service being assured to Ontario and Quebec customers by the Canadian route, as matters developed the Canadian portion of the route had been in service for two years before export actually commenced in 1960.

Trans-Canada says that it is aware of no consideration of national policy with which its project would be inconsistent, and argues that, gas service having been supplied to Northern Ontario and provision made for expansion of such supply as may be required, the Company's responsibility is to supply its Canadian distributors with their additional gas requirements at the lowest possible cost consistent with reliable service, and that the Great Lakes Project in its view best serves the objectives of economy and reliability.

The Board is satisfied that the reasonable requirements of customers in Northern Ontario would for some time be adequately met by the existing system through Northern

Ontario, given the flexibility of operation associated with the Great Lakes Project or any equivalent program, and that Trans-Canada has every intention of making suitable additional provision for gas requirements in that area as they develop. The evidence of Northern and Central, the only company at present distributing natural gas in Northern Ontario, supports that view. As previously noted, the contrary views expressed and the alternative route proposed by the Lakehead Intervenors have been met by Trans-Canada, with whose position in these respects the Board concurs.

As noted previously in this Report Trans-Canada's participation in the Great Lakes Project is accomplished through the use of two corporate entities, namely Great Lakes Gas Transmission Company, a company incorporated under the laws of Delaware, and Alberta Inter-Field Gas Lines Limited, a private company incorporated under the laws of the Province of Alberta. Trans-Canada's Act of Incorporation (S.C.1950-51, Chapter 92, as amended by S.C.1953-54, Chapter 80) while giving to the Company wide corporate powers, contains a proviso that "the main pipe line or lines, either for the transmission of gas or oil shall be located entirely within Canada". Although the Company's corporate arrangements in



the Great Lakes Project seem to have been designed with this proviso in mind, they do not in the circumstances of this case appear to be unlawful.

The international nature of the Project requires discussion in another aspect, which may in ways not at present measurable have an effect upon both the cost and the reliability of Trans-Canada's proposed service to its customers in Southern Ontario and Quebec through Great Lakes. It has already been noted that the Board's assessment of the Great Lakes Project as being economically and financially feasible rests on the assumption that the FPC will see fit to approve the application by Great Lakes, and the associated applications by Michigan Wisconsin and Midwestern, substantially unchanged. This is the immediate application of what remains a continuing assumption about the future development of the Trans-Canada and Great Lakes systems as an integrated whole. This is the assumption that the regulatory agencies of both countries will always move in the same direction, and within a short time of one another, in dealing with inter-related applications, by Trans-Canada in Canada, by Great Lakes in the United States. So far as Canada is concerned, the assumption must be broadened to include the Government, since issuance of Certificates and Licences by this Board requires the approval of the Governor in Council. This is a very large assumption, and not to be taken for granted.

In saying this, the Board is not in any sense criticizing or reflecting unfavourably upon the past or present regulatory processes of the United States authorities, nor is it viewing the future with gloom. On the contrary, as anyone must know who has read the history of the applications to the FPC involving Canadian gas in the last ten or twelve years, there has increasingly been a friendly and sympathetic hearing for such applications, as the Commission and its staff have become more familiar with the potential of Canadian gas production and with the structure of the Canadian gas production and transmission industries, and particularly as experience has demonstrated that a contract with a Canadian supplier, or an authorization from a Canadian regulatory body, can be relied upon. The "amity and comity" in relations between the two countries in respect of gas, to which reference has been made in FPC decisions, is real, and highly valued by this Board. For its part, the Board is well aware that a healthy export market is vital to the well-being of the natural gas industry in Canada, and it also believes that the growing interdependence of the two countries in terms of energy is mutually beneficial, and can be made more so if its development is carefully reconciled at each stage with the national interests of the participating countries. From its reading of FPC decisions, the Board believes that that Commission takes a similar view.

It is against this background that the Board looks at the prospect of future increments in supplies of gas for Southern Ontario and Quebec having to be arranged so as to conform with the regulatory requirements of both Canada and the United States. Trans-Canada under examination confirmed that, once Great Lakes was in being, increases in the requirements of these markets could for the foreseeable future be most economically met by additions to the Great Lakes facilities. Trans-Canada acknowledged that the fact of having to conform with the regulatory procedures of both countries would be a burden, but apparently looked on it as an administrative formality rather than any hazard to the nature and timing of future development of the inter-related systems. Trans-Canada witnesses referred to the Great Lakes line, in this context, as being in effect a loop of Trans-Canada which would enjoy a special position before the FPC, and could look forward to receiving approval of additional imports for transmission to Canada, and related increases in facilities, as pretty much a matter of course.

If the Great Lakes line were built and put into operation, any application to increase its capacity, or to import more Canadian gas for re-delivery to Trans-Canada at Sault Ste. Marie and Sarnia, would be exposed to interventions from other United States pipe line companies who claimed they



could provide equivalent service in a manner more in keeping with the standards applicable under the Natural Gas Act, from other would-be suppliers of gas, and from customers within the United States who might claim that they were entitled, under the provisions of the Natural Gas Act, to be supplied from the gas proposed to be added to the throughput of the Great Lakes line. Even if the proposals of Trans-Canada for the disposition of the gas to be provided by it to Great Lakes, either for transportation to Canada or for sale in the United States, were upheld in each case, the outcome would appear only after the due process applicable under United States law had run its full course. In each case, a Canadian export and corresponding import Licence, as well as a facilities Certificate, would have to be obtained, and the two sets of authorizations would have to be brought into substantial conformity with one another by amendment if one or the other national regulatory agency in the first instance imposed conditions inconsistent with the authorizations granted earlier or later by the other national agency. Not only does this raise the prospect of considerable time being required at each stage of expansion of Trans-Canada's shipments through Great Lakes, but it raises the very important question whether the future gas requirements of the Southern Ontario and Quebec markets can safely be left dependent on so complicated and potentially unsatisfactory a procedure.

The fact that the Great Lakes Project postulates a continuing synchronization of the regulatory agencies of two sovereign nations, in short, raises a very serious problem as to how to ensure that incremental facilities would be authorized by all agencies concerned in time to meet the growth requirements of the markets in Southern Ontario and Quebec, which constitute a very large part of Trans-Canada's total market, and a central and vital sector of the Canadian energy economy.

It can be argued that, in the event of any lapse in the mutuality of interest between the two countries which could be assumed to exist if the Great Lakes Project receives initial approval from both Canada and the United States, the Northern Ontario line could then be looped. Trans-Canada has said in evidence that after five years Great Lakes will be a viable proposition without any further increment in transportation of gas for Canadian account, and that Trans-Canada will then take a fresh look at the desirability of providing for the further requirements of the Southern Ontario and Quebec markets by a major program of looping through Northern Ontario. However, since by Trans-Canada's own testimony the expansion of capacity of Great Lakes, once installed, will for the foreseeable future be economically more attractive than development of substantial new capacity in Northern Ontario, it would be a costly process to loop in

Northern Ontario after having installed the Great Lakes system. If the prospect of having to loop in Northern Ontario in a few years is a real one, it might well be best to install the Northern Ontario loop in the first instance, despite the higher cost of transmission in the initial years, and thereby achieve the reliability of a dual-line system wholly within Canadian control.

The provisions for ownership and management of Great Lakes reflect some aspects of the problem of dual jurisdiction. It is intended that Trans-Canada and Michigan Wisconsin will share equally in the ownership of the equity in Great Lakes, and will each elect an equal number of directors. Trans-Canada has stated that it is understood that it will nominate the chief executive officer, although the evidence is that there is no formal agreement on this point. Trans-Canada has further said that it intends to maintain its 50 per cent ownership in Great Lakes permanently, apparently through its subsidiary Alberta Inter-Field, and that it will not dispose of this ownership or reduce its proportion without asking leave of this Board. While the Board accepts all this as being put forward in good faith, it observes that its statutory powers do not extend to the direct regulation of such investment transactions of pipe line companies under its jurisdiction and certainly do not



extend to the investment transactions of a provincially incorporated company even though it is a subsidiary of a company under the Board's jurisdiction. If another generation of management in Trans-Canada were to find it desirable to dispose of its shares in Alberta Inter-Field or of Alberta Inter-Field's shares in Great Lakes, there would appear to be nothing within the Board's statutory powers which would enable the Board to prevent or regulate such action. Aside from such a contingency, there is in the scheme of equal ownership and direction of Great Lakes a considerable potential for deadlock and delay, with no assurance that the affairs of Great Lakes, so far as they relate to the transmission of gas for Canadian account, would be conducted in a manner equally satisfactory, from a Canadian viewpoint, as would the affairs of a wholly Canadian company operating within Canadian jurisdiction.

A minor but possibly significant example is the position taken by Trans-Canada that dividends received by it as a result of its equity ownership in Great Lakes should not be regarded as pipe line revenue, within the meaning of the Board's Uniform Classification of Accounts for Gas Pipe Line Companies. This position accords ill with the view otherwise urged upon the Board by Trans-Canada that the Great Lakes line would for practical purposes be a loop of its existing system.

The foregoing paragraphs have set forth the Board's doubts as to the attractiveness of the Great Lakes Project in terms of reliability, very broadly defined. On the other side, the Board agrees with Trans-Canada's submission that the Great Lakes Project would in two construction seasons provide a complete alternative means of supplying gas to the markets of Southern Ontario and Quebec, and thereby enhance very greatly the reliability of service to customers in those areas. The Great Lakes line would also provide the benefit of interconnection with the facilities and resources of the American Natural system, and thereby secure the advantages (and assume the obligations) of mutual support in the event of emergency affecting either the Trans-Canada, the Great Lakes, or the American Natural systems. These are very material benefits indeed, although it is not easy to put a specific value on them. The Great Lakes Project would add to the reliability of part of the Northern Ontario system, to the extent that the flow of gas could be reversed at Maple, near Toronto, and gas moved northward in the present 30-inch system in the event of an interruption of service in Northern Ontario.

Looping of the present line through Northern Ontario, while it would not be completed for about eight years, would provide greater security of service for

Northern Ontario when completed, but it would not provide the benefit of interconnection with and potential emergency support from the American Natural system.

Another aspect of reliability which favours the Great Lakes Project has been touched upon in preceding chapters, but should be emphasized again here. This is the fact that the Great Lakes line, since it would pass close by and be connected with the large storage fields at Austin, Michigan, the smaller one at Belle River Mills, Michigan, and the large fields in the Dawn area of Western Ontario, would have the reliability and flexibility of service which storage capacity close to markets can confer. In the event of either an interruption of service upstream of the storage facilities, or a peak in demand above the maximum daily capacity of the upstream facilities, such storage can tide a pipe line system over a major emergency.

It can also provide very substantial economic benefits, in that valley gas can be stored and delivered as peaking service or other high-value gas. It is very difficult to evaluate such economic benefits definitively, and neither Trans-Canada's submission nor the Board's calculations have produced such an evaluation, but the Board shares the view of Trans-Canada and its customers that the value is indeed substantial, and could not be matched by moving gas to and



from the Dawn storage fields from Trans-Canada's present system, as it stands or if looped along the present route.

The Board is prepared to accept that the Great Lakes Project is financible, at rates close to those set forth in the application, if the FPC approves the Project. Trans-Canada indicated in evidence that the financing of an alternative looping program in Canada would be "extremely difficult but manageable". The interest rates which would be applicable could be determined only after Trans-Canada was in a position to show the financial community a "package", including purchase contracts, sales contracts, facilities costs and feasibility analyses relating to a program of looping in Canada. The costs of borrowing for capital investment in Canada are normally higher than for similar investment in the United States; the supply of funds within Canada for pipe line investment is unlikely, in the light of past experience, to be adequate to cover a project of this size; access of Canadian borrowers to United States capital markets in the near future is not to be taken for granted; the Canadian economy is at a high level of activity, and the Minister of Finance in his Budget Speech of 29 March 1966 asked that capital investments in Canada, particularly those requiring borrowing in the United States, be deferred where possible. In these circumstances,

good reason is required to refuse a Canadian enterprise authorization for a project in which it would, for an equity investment of 17 million dollars (US), obtain a half-interest in a pipe line system to be financed on its own credit and expected to involve facilities costing 212 million dollars (US) in two years. Such a refusal would leave the Canadian company in a position where it virtually must raise, on its own unassisted credit, very large sums.

How large the sums would be would depend on which looping program for Northern Ontario would be developed. Trans-Canada says that its studies show a cumulative investment advantage for 30-inch loop over a period so long that it would not be prudent to make the higher investment required for a 36-inch loop. While Trans-Canada would, in the case of the Great Lakes Project proceeding, spend some 91 million dollars in the first two years on related construction in Canada, its total expenditures in the absence of Great Lakes were estimated for the first two years, in the case of a 30-inch loop at 209 million dollars and in the case of a 36-inch loop at 352 million dollars, a difference of 118 million dollars and 261 million dollars respectively. Over an eleven-year period the cumulative differences would be 272 million dollars and 351 million dollars respectively.

The choice of pipe diameter is essentially a reflection of the estimate of the market available. Trans-Canada stated and the Board agrees that a 36-inch line would be more economical in the long term than a 30-inch line. Trans-Canada however argues that the prices set forth in its contracts for sales in Canada contingent on Great Lakes are possible only on the basis of the whole Great Lakes Project. Absent Great Lakes, it would have to sell gas to its Canadian customers at prices the same as, or higher than, those now in effect. At such prices, it could not secure more sales than enough to justify a 30-inch loop.

The Board appreciates that Trans-Canada would find it difficult to secure contracts covering approximately the same volume of sales in Canada as estimated with the Great Lakes Project, as would be necessary to warrant the construction through Northern Ontario of a 36-inch line, even though it does not agree with the total savings in transmission costs postulated by Trans-Canada for the Great Lakes Project.

The Board's analysis indicates that over a ten-year period there is a relatively small saving in the transmission costs in favour of the "Great Lakes - adjusted" case over the "without Great Lakes, high forecast, 36-inch line" case. However, over the first five years the margin



is significant. This margin reflects the special rates for the first four years included in the proposed transmission contract between Trans-Canada and Great Lakes, during which Great Lakes would earn a lower rate of return than anticipated in the long term.

The "without Great Lakes, high forecast, 36-inch line" case is premised, of course, on Trans-Canada being able to offer sales contracts to its major distributors having prices and other non-price incentives similar or equivalent to those contained in the contracts contingent upon Great Lakes.

This would necessitate Trans-Canada accepting a lower rate of return during the first five years than it has postulated in its application and perhaps even lower than it has been earning in recent years and, at the same time, raising the additional equity and debt capital required to finance the 36-inch looping program through Northern Ontario; this lower rate of return would contribute to the difficulty and perhaps to the cost of financing such an expenditure in Canada.

The Board has Trans-Canada's assurance that the financing of either a 30-inch or 36-inch looping program through Northern Ontario, while difficult, would be manageable, but it does appear that on balance the considerations as to

cost of service and capital investment would favour the Great Lakes Project, under the circumstances now existing.

One of the merits claimed by Trans-Canada for the Great Lakes Project is that it involves additional exports, specifically in the form of sales of 116 MMcf/d to Midwestern and sales to Great Lakes rising to 87.6 MMcf/d, and more generally in prospective additional sales through Great Lakes to American Natural and possibly other customers in the United States. The Board has previously found in respect of the exports to Midwestern, and here has found as regards the exports to Great Lakes, that the quantities sought to be exported would not exceed the surplus remaining after due allowance has been made for the reasonably foreseeable requirements for use in Canada having regard to the trends in the discovery of gas in Canada. The Board has also previously found that the price to be charged to Midwestern for the 116 MMcf/d of gas to be exported to Midwestern is just and reasonable in relation to the public interest, and has here made the same finding as to the gas to be exported to Great Lakes. (The findings in respect of Midwestern are set forth in the Board's July 1965 Report, and are reflected in Licence GL-18 authorizing that export to Midwestern.) On the Board's calculation, these exports would result in a reasonable profit to

Trans-Canada. They would also result in a substantial contribution to Canadian receipts of United States dollars.

These contracts are, directly or indirectly, contingent on the Great Lakes Project. The Board does not think it reasonable to assume that, if these particular export contracts were cancelled because Great Lakes was not built, no equivalent contracts would ever be established. Gas is in such demand in North America that Canadian supplies which may become surplus from time to time are likely to be saleable to one or another purchaser in the United States. The time and price at which such replacement sales might be contracted are of course not predictable, nor can it be assumed that Trans-Canada would be the transmitter of such replacement exports.

At the moment, the significant point is that these particular export contracts are contingent on the Great Lakes Project being built, and incremental requirements of gas for Southern Ontario and Quebec being transmitted through Great Lakes. From one point of view, the Great Lakes Project essentially proposes that the Canadian economy, through Trans-Canada, should purchase gas transportation service from a United States corporation rather than undertake the capital expenditures necessary to provide that service in Canada. While the transportation contract between Trans-Canada and Great Lakes provides attractive rates, particularly



as regards the volumes to be moved in the first four years of operations, the transportation payments do represent an outflow of United States dollars for moving Canadian gas to Canadian markets. This outflow would amount to approximately 294 million dollars (Canadian) by 1976. Temporary imports, in the years ending 1 November 1967 and 1968, from Great Lakes and Michigan Consolidated, would give rise to an outflow of another 33 million dollars (Canadian). The total of these outflows would exceed the inflow of exchange from the export contracts with Great Lakes and Midwestern, which would total 194 million dollars by 1976 at the level of exports now applied for. The cumulative net outflow would be about 133 million dollars over the first ten years.

To put the matter another way, the net effect of offsetting export earnings against payments to Great Lakes for transportation of Western Canadian gas to Eastern Canadian markets appears to be an average annual outflow of about 13 million dollars (Canadian). Unless export volumes were to rise radically in relation to volumes transported to Eastern Canada, there appears to be no reason to expect any reduction in these outflows over the subsequent years of operation.

If Great Lakes did not proceed, and the present Trans-Canada line were looped by a 36-inch line, at the

costs estimated by Trans-Canada, there would be an exchange outflow in terms of interest on funds borrowed in the United States. Data before the Board permits only a rough estimate of what this would be, and requires the use of a number of assumptions. The first is that the ratio of debt to equity would be of the order of 75 per cent debt to 25 per cent equity, having in mind Trans-Canada's recent issue of 50 million dollars worth of preferred shares and the fact that its present debt/equity ratio is somewhat higher than the average for natural gas transmission companies in North America. Of the new debt, the major proportion would probably be raised in the United States; the range of possible proportions is wide, but for purposes of this calculation 70 per cent is assumed. The rate of interest has been assumed to be 6.5 per cent, even though it is unlikely that rates will remain at the present high levels throughout the 10-year period. On these assumptions, the dollar outflow to the United States to service the debt related to the capital costs of a 36-inch loop, in excess of those incurred in Canada if the Great Lakes Project were built, would, over the period 1966-1976, be in the region of 110 million dollars, whereas the outflow with Great Lakes, net of export earnings, would be about 133 million dollars over the first ten years. Any export contracts which replaced those contingent on Great Lakes would produce United States dollar earnings to

offset some part of the payments on account of interest in the case "without Great Lakes".

The point of this discussion is that, while Trans-Canada naturally and properly places considerable value upon the export contracts contingent on Great Lakes in its calculation of the benefits to it of Great Lakes, the project may not be attractive when examined in terms of its current account external payments implications for Canada as a whole. These current account disadvantages would persist for the life of the project, unless there were a radical upward shift in the proportion of export gas to gas for return to Canada in the "mix" of gas associated with the Great Lakes Project, and the Board can not assume any such change in proportions. On the other hand, the disadvantages of raising the capital required to build a loop in Canada are not necessarily of a similarly persistent nature, and may diminish or disappear in a relatively short time. On balance, therefore, the foreign exchange implications of the Great Lakes Project appear to the Board to weigh against the project, constituting a national cost, though not a cost to Trans-Canada.

Another general economic consideration, which was referred to by the Lakehead Intervenors, and concerning which Trans-Canada was questioned by the Board, is the income generation effect which would be felt in Canada if the facilities necessary to move the incremental requirements



of gas for Southern Ontario and Quebec were installed in Canada. Trans-Canada attempted to rebut the point made by the Lakehead Intervenors in this regard by calculations intended to show that the investment in Great Lakes in the United States would be at least matched by expenditures in Canada in the exploration for and production and processing of gas and in other activities related to the supplying of gas to be transmitted through Great Lakes. Granted that such expenditures would be to some extent reduced if the export contracts contingent on Great Lakes were lost, they would be deferred rather than permanently lost unless one assumes that gas not developed to serve these particular contracts will never be developed. The same applies to the exploration and production expenditure effects of any diminution of the Canadian market which might be entailed in substitution of a loop within Canada for the Great Lakes line. Trans-Canada's evidence did not meet the point that the investment in a loop of the present line through Northern Ontario would have income generation effects important for Northern Ontario and perhaps significant for Canada as a whole. A Board calculation, using Trans-Canada's estimates as to cost, timing and source of materials for a looping program in Canada, suggests that these "multiplier

effects" would generate income in Canada in the ten years following commencement of construction in the order of a billion dollars in the case of a 36-inch loop and some 700 million dollars in the case of a 30-inch loop. While these figures were not tested by cross-examination, and are therefore mentioned only as being indicative rather than substantive, it is apparent that whatever the right figures may be, these income generation effects would be permanently lost to Canada if the Great Lakes line were built, and a further loss would occur at each stage at which the facilities of Great Lakes were increased rather than facilities in Canada.

In view of the previously mentioned high level of activity in the economy, and the current policy of deferring capital investment where possible, it may be in the short-term general Canadian interest that these income effects be foregone. From the longer-term point of view, it must be remembered that once the commitment to Great Lakes was made, there would be a strong tendency for future development to be made in that system, rather than in the system through Northern Ontario, notwithstanding that the present desirability of deferring capital expenditures in Canada may not long continue.

CONCLUSIONS

In setting forth its views, the Board is acutely aware that the only application before it is that encompassing the Great Lakes Project. To reject that application, after having found that Trans-Canada's Canadian markets require additional gas, and, at the prices set forth in the contracts contingent on Great Lakes, can absorb substantially the quantities set forth in those contracts, would mean that there would be a period of delay while Trans-Canada negotiated alternative contracts with its suppliers and customers, put together another project to move the then contracted volumes to Canadian markets, and a new application was heard and decided upon. The effects of such a delay would be difficult to cope with in the short run, involving serious problems of interim supply, and the longer run effects cannot on present knowledge be accurately assessed.

The impetus of a carefully prepared project, supported by supply and sales contracts, shown on the record to be financible and economically feasible, as this project has been, is valuable and not lightly to be destroyed. In an enterprise economy, an imaginative and constructive initiative, such as that underlying this application, is to be encouraged, unless there are clear grounds of public policy on which it is unacceptable.



Certain areas of public policy in this case seem to the Board to be particularly important. These are the questions of whether the means of transmitting incremental supplies of Canadian gas to markets in Southern Ontario and Quebec should become established in another country; whether the balance of payments considerations resulting from the purchase of this transportation service in United States dollars, less United States dollar earnings on associated exports, are acceptable; whether in Canada's present economic position it is appropriate to forego the investment within Canada required to provide such service, and to forego the associated income effects.

On the matters which normally arise in respect of applications to it for certificates of public convenience and necessity and for export licences, the Board has herein set forth its findings seriatim. So far as supply, surplus over Canadian requirements, markets available to the pipe line, proposed facilities, economic feasibility and finability are concerned, the Board, having given due consideration to the evidence before it, the advice of its staff, and its own knowledge, concludes on balance and in general that the construction of the facilities proposed by Trans-Canada in relation to the Great Lakes Project is and will be required by the present and future public convenience and

necessity, and accordingly is prepared, subject to the approval of the Governor in Council, to issue a certificate appropriate to the particular matters set forth in the application, with certain exceptions and subject to certain conditions. Similarly, the Board has satisfied itself that the export to Great Lakes, contingent on the Great Lakes Project, is consistent with the tests established under the National Energy Board Act, and accordingly the Board is prepared to issue a licence in that regard, subject to certain conditions, if the Governor in Council approves of the certificate and the licence.

The Board's decisions on the specific requests in Trans-Canada's application are set out below in the order of their appearance in the application.





DISPOSITION

The Board has given careful consideration to all evidence presented to it and, in addition to Certificate of Public Convenience and Necessity No. GC-29 approved by the Governor in Council by P.C. 1966-1395, dated 25 July 1966,\* is prepared to issue to Trans-Canada Pipe Lines Limited ("the Company") the certificate, orders and licences specified in items A to G below, subject, in respect of the certificate and licences, to the approval of the Governor in Council and subject in each case to the following general conditions:

(1) The Company shall, on or before the 1st day of February, 1967, unless a later day is fixed by the Board and approved by the Governor in Council, file those Orders, Certificates of Public Convenience and Necessity, Permits and other authorizations of the Federal Power Commission of the United States of America which may be issued pursuant to the application by Great Lakes Gas Transmission Company under Docket Nos. CP66-110, CP66-111 and CP66-112, by Michigan Wisconsin Pipe Line Company under Docket No. CP66-109 and by Midwestern Gas Transmission Company under Docket Nos. CP66-120 and CP66-121.

\* See Appendix 23 to this Report.

(2) The Company shall forthwith after compliance with Condition (1) satisfy the Board that the authorizations referred to in the said Condition do not materially reduce the benefits to Canada of the "Great Lakes Project" as evaluated by the Board.

(A) a Certificate of Public Convenience and Necessity for the construction and operation of certain additional pipe line as set forth in the application, as amended, excluding therefrom the additional pipe line in respect of which the Board has issued Certificate of Public Convenience and Necessity No. GC-29 dated the 26th day of July, 1966, and excluding the 123.50 miles of 26-inch O.D. pipe line, consideration of which was, on the motion of the Company, deferred sine die. The Certificate shall be subject to the following terms and conditions:

(1) The additional pipe line shall be the property of and be operated by the Company.

(2) The additional pipe line shall be constructed and installed in accordance with those specifications set forth in the application and as amended in evidence before the Board and on record with the Board; but the Company shall apply to the Board for approval of its final design, plans and specifications for the construction of the additional pipe line described under the heading "1967 Construction" in item D of Part I of Appendix 2 to this

Report at least four months prior to the expected date of commencement of construction or prior to the 1st day of February, 1967, whichever is the earlier, and construction of the said pipe line shall not commence until such approval has been obtained.

(3) The testing of the additional pipe line shall be carried out in conformity with the Board's requirements.

(4) The construction and installation of the additional pipe line shall be completed by the 31st day of March, 1968, unless upon application by the Company a later day is fixed by the Board and approved by the Governor in Council.

(B) an Order pursuant to section 36 of the Act approving the relocation of part of the Company's pipe line as described in Part VII of Appendix 2 to this Report.

(C) an Order amending Licence No. GL-1, as amended by Order No. AO-1-GL-1, by deleting conditions (2) and (4) of the said Licence No. GL-1 and substituting therefor the following:

(2) (1) The quantity of gas that may be exported under the authority of and in accordance with the Licence shall not exceed 223,000,000 cubic feet in any one day, nor 74,000,000,000 cubic feet in any consecutive twelve-month period ending on the 31st day of October, nor 1,410,000,000,000 cubic feet during the term of this Licence;



(2) notwithstanding subsection (1), as a tolerance the Company may export in any one day a quantity of gas exceeding 223,000,000 cubic feet by not more than two per cent of that amount; and

(3) notwithstanding subsection (1), and for the purpose only of alleviating temporary operating problems caused by pipe line or equipment failure, the Company may export in any one day a quantity of gas exceeding 223,000,000 cubic feet by not more than 10 per cent of that amount.

(4) The prices to be received from time to time by the Company for the gas exported hereunder shall be not less than those prices provided for in an Agreement dated the 14th day of April, 1960, between the Company and Midwestern Gas Transmission Company, as amended by an Agreement dated the 14th day of October, 1965, placed in evidence before the Board in Exhibit 1-1 and summarized in Appendix 4 to this Report.

(D) a Licence for the exportation of gas at a place on the international boundary line between Canada and the United States of America near Emerson in the Province of Manitoba, subject to the following terms and conditions:

- (1) The term of the Licence shall be for a period commencing on a day to be fixed by the Board and terminating on the 31st day of October, 1990.
- (2) The quantity of gas that may be exported under the authority of and in accordance with the Licence shall not exceed 87,600,000 cubic feet in any one day, nor 32,100,000,000 cubic feet in any consecutive twelve-month period ending on the 31st day of October, nor 765,000,000,000 cubic feet during the term of the Licence.
- (3) Notwithstanding condition (2), as a tolerance the Company may export in any one day a quantity of gas exceeding 87,600,000 cubic feet by not more than two per cent of that amount.
- (4) Notwithstanding condition (2), and for the purpose only of alleviating temporary operating problems caused by pipe line or equipment failure, the Company may export in any one day a quantity of gas exceeding 87,600,000 cubic feet by not more than 10 per cent of that amount.
- (5) The Company shall comply with all valid terms and conditions of Permit No. TC 64-6 dated the 1st day of December, 1964, as amended the 29th day of June, 1966, issued to it by the Oil and Gas Conservation Board of Alberta.

- (6) (1) The prices to be received from time to time by the Company for the gas to be exported shall be not less than those prices specified in Article VIII of Exhibit B attached to an Agreement between Great Lakes Gas Transmission Company, Michigan Wisconsin Pipe Line Company, Michigan Consolidated Gas Company and the Company, dated the 24th day of September, 1965, which was placed in evidence before the Board in Exhibit 1-4 and is summarized in Appendix 3 to this Report.
- (2) The volume of gas paid for at the price for overrun gas stipulated in the said agreement shall not exceed 5 per cent of the annual volume exported.
- (7) The Company shall not agree to any termination of, amendment to or agreement substituted for the Agreement referred to in subsection (1) of Condition (6) without the prior approval of the Board.
- (8) The quantity, specific gravity and higher heating value of all gas exported under the authority of and in accordance with the Licence shall be measured by the Company, in a manner approved by the Board, near the place of exportation on the international boundary line between Canada and the United States of America.



(E) a Licence for the exportation of gas at a place on the international boundary line between Canada and the United States of America near Emerson, in the Province of Manitoba, and for the importation of the same gas at places on the international boundary line between Canada and the United States of America near Sault Ste. Marie and near Sarnia, both in the Province of Ontario, subject to the following terms and conditions:

- (1) The term of the Licence shall be for a period commencing on a day to be fixed by the Board and terminating on the 31st day of October, 1990.
- (2) The quantity of gas that may be exported and imported under the authority of and in accordance with the Licence shall not exceed 677,000,000 cubic feet in any one day, nor 247,782,000,000 cubic feet in any twelve-month period ending on the 31st day of October, nor 6,000,000,000,000 cubic feet during the term of the Licence.
- (3) The Company may export under the Licence only that gas which is to be imported under it, and shall import all such gas so exported.

- (4) Notwithstanding condition (2), as a tolerance the Company may export and import in any one day, a quantity of gas exceeding 677,000,000 cubic feet by not more than two per cent of that amount.
- (5) Notwithstanding condition (2), and for the purpose only of alleviating temporary operating problems caused by pipe line or equipment failure, the Company may export and import in any one day a quantity of gas exceeding 677,000,000 cubic feet by not more than 10 per cent of that amount.
- (6) The rates to be paid by the Company for the transportation of the gas by Great Lakes Gas Transmission Company from Emerson, in the Province of Manitoba, to Sault Ste. Marie and Sarnia, both in the Province of Ontario, shall not exceed those specified in Article VIII of Exhibit A attached to the Agreement between Great Lakes Gas Transmission Company, Michigan Wisconsin Pipe Line Company and Michigan Consolidated Gas Company and the Company, dated the 24th day of September 1965, which was placed in evidence before the Board in Exhibit 1-4 and is summarized in Appendix 3 to this Report.
- (7) The Company shall not agree to any termination of, amendment to or agreement substituted for the Agreement referred to in Condition (6) without the prior approval of the Board.

- (8) The Company shall comply with all valid terms and conditions of Permit No. TC 64-6 dated the 1st day of December, 1964, as amended the 29th day of June, 1966, issued to it by the Oil and Gas Conservation Board of Alberta.
  - (9) The quantity, specific gravity and higher heating value of all gas exported and imported under the authority of and in accordance with the Licence shall be measured by the Company, in a manner approved by the Board, near the places of exportation and importation on the international boundary line between Canada and the United States of America.
- (F) a Licence for the exportation of gas at a place on the international boundary line between Canada and the United States of America near Emerson, in the Province of Manitoba, subject to the following terms and conditions:
- (1) The term of the Licence shall be for a period commencing on a day to be fixed by the Board and terminating on the 31st day of October, 1967.
  - (2) The quantity of gas that may be exported under the authority of and in accordance with the Licence shall be not more than 3,000,000,000 cubic feet.



- (3) The price to be received from time to time by the Company for the gas to be exported shall be not less than 27.705 cents (U.S.) per Mcf.
  - (4) The quantity, specific gravity and higher heating value of all gas exported under the authority of and in accordance with the Licence shall be measured by the Company, in a manner approved by the Board, at the place of exportation on the international boundary line between Canada and the United States of America.
- (G) a Licence for the importation of gas at a place on the international boundary line between Canada and the United States of America near Sarnia, in the Province of Ontario, subject to the following terms and conditions:
- (1) The term of the Licence shall be for a period commencing on a day to be fixed by the Board and terminating on the 1st day of November, 1968.
  - (2) (1) During that period from the commencement of the Licence to the 1st day of November, 1967, the quantity of gas that may be imported under the authority of and in accordance with the Licence shall not exceed 59,245,000,000 cubic feet.
  - (2) During that period commencing on the 1st day of November, 1967, and ending on the 1st day of November,

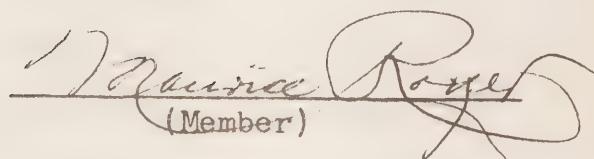
1968, the quantity of gas that may be imported under the authority of and in accordance with the Licence shall not exceed 23,058,000,000 cubic feet.

- (3) The gas shall be imported at that price which is in accordance with the provisions of Article VII of Appendix D of the Agreement dated the 24th day of September 1965, between Great Lakes Gas Transmission Company, Michigan Wisconsin Pipe Line Company and Michigan Consolidated Gas Company and the Company, which was placed in evidence before the Board in Exhibit 1-4 and is summarized in Appendix 4 to this report.
- (4) The Company shall not agree to any termination of, amendment to or agreement substituted for the Agreement referred to in condition (3) without the prior approval of the Board.
- (5) The quantity, specific gravity and higher heating value of all gas imported under the authority of and in accordance with the Licence shall be measured by the Company, in a manner approved by the Board, near the place of importation on the international boundary line between Canada and the United States of America.

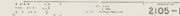
All of which is respectfully submitted.

  
(Chairman)

  
(Member)

  
(Member)







EXTRACTS FROM THE APPLICATION

- I. For a certificate under Part III of the Act to construct and operate additional pipe line facilities, namely:

1966 CONSTRUCTIONA - ADDITIONS TO EXISTING COMPRESSOR STATIONS

Station 2 near Burstall, Saskatchewan add two - 8,000 h.p. turbine driven compressors

Station 41 near Ile Des Chenes, Manitoba add one - 12,100 h.p. turbine driven centrifugal compressor,

Station 802 near Candiac, Quebec add one - 275 h.p. engine driven reciprocating compressor,

together with works connected therewith; and

B - NEW PIPE LINE

0.20 miles of dual 24" O.D. pipe line in Ontario easterly from a point on the international boundary in the St. Clair River; and

13.80 miles of 36" O.D. pipe line in Ontario extending from a point of connection with the proposed 24" O.D. dual river crossing easterly to a point of connection with the facilities of Union Gas Company of Canada, Limited in Dawn Township in Ontario

together with works connected therewith, and

C - PIPE LINE LOOP

A total of 63.41 miles of 34" O.D. pipe line in Saskatchewan comprised of 9.26 miles between Stations 2 and 5, 7.13 miles between Stations 5 and 9, 19.34 miles between Stations 9 and 13, 6.16 miles between Stations 13 and 17, 9.25 miles between Stations 17 and 21 and 12.27 miles between Stations 21 and 25; and

A total of 25.31 miles of 34" O.D. pipe line in Manitoba comprised of 11.43 miles between Stations 25 and 30 and 13.88 miles between Stations 30 and 34; and



12.10 miles of 24" O.D. pipe line in Ontario  
extending downstream of Station 130

together with works connected therewith; and

1967 CONSTRUCTION

A - NEW COMPRESSOR STATIONS

Station 144 near Augusta, Ontario powered by one  
3,000 h.p. motor driven reciprocating compressor,

Station 209 near Ancaster, Ontario powered by three  
2,500 h.p. engine driven reciprocating compressors,

Station 502 in Dawn Township, Ontario powered by  
three 2,500 h.p. engine driven reciprocating com-  
pressors,

together with works connected therewith; and

B - ADDITIONS TO EXISTING COMPRESSOR STATIONS

(1) by the relocation of existing compressor units  
at Stations 70, 84, 95, 119 and 127 as follows:

Station 5 near Cabri, Saskatchewan add one  
12,100 h.p. turbine driven centrifugal com-  
pressor,

Station 9 near Herbert, Saskatchewan add one  
12,100 h.p. turbine driven centrifugal com-  
pressor,

Station 30 near Rapid City, Manitoba, add one  
10,600 h.p. turbine driven centrifugal com-  
pressor,

Station 34 near Portage La Prairie, Manitoba  
add one 10,600 h.p. turbine driven centrifugal  
compressor,

Station 41 near Ile Des Chenes, Manitoba add  
one 10,600 h.p. turbine driven centrifugal com-  
pressor,

together with works connected therewith; and

(2) by the addition of new compressor units as  
follows:

Station 13 near Caron, Saskatchewan add one  
12,100 h.p. turbine driven centrifugal com-  
pressor,

Station 17 near Regina, Saskatchewan add one 12,100 h.p. turbine driven centrifugal compressor,

Station 21 near Grenfell, Saskatchewan add one 12,100 h.p. turbine driven centrifugal compressor,

Station 25 near Moosomin, Saskatchewan add one 12,100 h.p. turbine driven centrifugal compressor,

Station 130 near Maple, Ontario add one 1,500 h.p. engine driven reciprocating compressor,

together with works connected therewith; and

C - NEW PIPE LINE

123.50 miles of 26" O.D. pipe line extending from a point of connection with the facilities of Union Gas Company of Canada, Limited in Dawn Township, easterly to a point of interconnection with existing facilities of Trans-Canada Pipe Lines Limited in the Township of Ancaster, both in the Province of Ontario; and

0.35 miles of 10.750" O.D. pipe line extending northerly from a point on the international boundary in the St. Mary's River near Sault Ste. Marie, Ontario in Awenge Township, Ontario; and

6.15 miles of 10.750" O.D. pipe line extending from a point of interconnection with the St. Mary's River crossing in the Township of Awenge to a point of interconnection with the proposed facilities of Great Northern Gas Company, Limited in Awenge Township,

together with works connected therewith; and

D - PIPE LINE LOOP

A total of 76.80 miles of 34" O.D. pipe line in Saskatchewan comprised of 23 miles upstream and 7 miles downstream of Station 9, 23 miles upstream and 14 miles downstream of Station 17 and 8 miles upstream and 1.80 miles downstream of Station 25; and

A total of 53.20 miles of 34" O.D. pipe line in Manitoba comprised of 17.20 miles downstream of Station 25, 10 miles upstream and 26 miles downstream of Station 34; and

A total of 7 miles of 36" O.D. pipe line in Manitoba downstream of Station 41 on the Emerson extension; and

4.94 miles of 24" O.D. pipe line in Ontario downstream of Station 130,

together with works connected therewith.

II. For a Licence under Part VI of the Act for the exportation of gas at a place on the international boundary between Canada and the United States near Emerson in the Province of Manitoba, subject to the following terms and conditions:

- (1) The term of the licence shall be for a twenty-five year period commencing on the 1st day of November, 1967;
- (2) The quantity of gas that may be exported under the authority of and in accordance with the licence shall not exceed 87,600,000 cubic feet in any one day or 32,100,000,000 cubic feet in any consecutive twelve month period ending on 1st November or 765,000,000,000 cubic feet during the term of the licence;
- (3) Notwithstanding the limitations in the quantity of gas that may be exported in any one day, for the purpose only of alleviating temporary operating problems caused by pipe line or equipment failure, the quantity of gas that may be exported in any one day shall be 110% of the quantity that may be otherwise exported in any one day;
- (4) Notwithstanding condition (2), as a tolerance, the amount the Licencee may export, may, in any twenty-four hour period, exceed the quantity of 87,600,000 cubic feet by two per cent of that amount.

III. For a Licence under Part VI of the Act for the exportation of gas at a place on the international boundary between Canada and the United States near Emerson, in the Province of Manitoba and for the importation of gas at places on



the international boundary between Canada and the United States near Sault Ste. Marie and Sarnia, both in the Province of Ontario, subject to the following terms and conditions:

- (1) The term of the licence shall be for a twenty-five year period commencing on the 1st day of November, 1967;
- (2) The maximum quantities of gas that may be exported under the authority of and in accordance with the licence shall not be more than 677,000,000 cubic feet in any one day, nor more than 247,782,000,000 cubic feet in any consecutive twelve month period ending on the 31st day of October nor more than 6,000,000,000,000 cubic feet during the term of the licence;
- (3) The quantity of gas that shall be imported under the authority of and in accordance with the licence shall be the gas exported from time to time pursuant to III (2);
- (4) Notwithstanding the limitations in the quantity of gas that may be exported or imported in any one day, for the purpose only of alleviating temporary operating problems caused by pipe line or equipment failure, the quantity of gas that may be exported or imported in any one day shall be 110% of the quantity of gas that may be otherwise exported or imported in any one day;
- (5) Notwithstanding the limitations in the quantity of gas that may be exported or imported in any one day, as a tolerance, the amount the Licencee may export or import, may in any twenty-four hour period exceed the quantity of 677,000,000 cubic feet by two per cent of that amount.

IV. For a Licence under Part VI of the Act for the exportation of gas at a place on the international boundary between Canada and the United States near Emerson, in the Province of Manitoba, subject to the following terms and conditions:

- (1) The term of the licence shall be for a period commencing on the date of initial delivery and ending on the 1st day of November, 1967;



- (2) The maximum quantity of gas that may be exported under authority of and in accordance with the licence shall not be more than 3,000,000,000 cubic feet.

V. For a Licence under Part VI of the Act for the importation of gas at a place on the international boundary between Canada and the United States near Sarnia, in the Province of Ontario, subject to the following terms and conditions:

- (1) The term of the licence shall be for a period commencing on the date of initial delivery and ending on the 1st day of November, 1968:
- (2) The maximum quantity of gas that may be imported under the authority of and in accordance with the licence shall not be more than 59,245,000,000 cubic feet during the period from the date of initial delivery to and including November 1, 1967, nor more than 23,058,000,000 cubic feet during the year commencing November 1, 1967 and ending November 1, 1968.

VI. For an Order pursuant to Section 17 of the Act, to change, alter and vary Licence No. GL-1 as amended by Order No. AO-1-GL-1 as follows:

- (1) Adding in condition 2(1) after the words "twelve month period" the words "ending on the 31st day of October,";

- (2) Adding the following new condition 2(3):

"2(3) notwithstanding the limitations in the quantity of gas that may be exported in any one day, for the purpose only of alleviating temporary operating problems caused by pipe line or equipment failure, the quantity of gas that may be exported in any one day shall be 110% of the quantity that may be otherwise exported in any one day."

- (3) Revoking condition (4) and substituting therefor the following condition:

"(4) The prices to be received from time to time by the Licensee for the gas exported hereunder shall be not less than those prices as provided for in an Agreement dated the 14th day of April, 1960, between the Licensee and Midwestern Gas

Transmission Company, as amended by a Letter Agreement dated the 14th day of October, 1965, all placed in evidence before the Board pursuant to amended Application dated the 30th day of December, 1965."

- VII. For an Order pursuant to Section 36 of the Act for the relocation of existing compressor units at Stations 70, 84, 95, 119 and 127 to Stations 5, 9, 30, 34 and 41, all as described in more detail under Item I, B, (1) of the 1967 Construction Program.



Summaries of Transportation and Gas Purchase Contracts  
between Trans-Canada Pipe Lines Limited and Great Lakes  
Gas Transmission Company

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Summary of Pro Forma Gas Purchase Contract between Great Lakes Gas Transmission Company and Trans-Canada Pipe Lines Limited .....	2



Summary of Pro Forma Gas Transportation Contract  
between  
Trans-Canada Pipe Lines Limited  
and  
Great Lakes Gas Transmission Company

Date - Precedent Agreement, 24 September 1965.

Effective - According to Precedent Agreement, within 30 days of acceptance by all parties of all regulatory authorizations requisite to Great Lakes Project.

Term - 25 years from date of initial delivery.

Type - Transportation - firm.

<u>Volumes</u>	<u>Contract Year</u>	<u>Contract Quantity Mcf/day</u>
	First Austin to St. Clair	113,000
	Second Austin to St. Clair	63,000
	Emerson, Manitoba to Sault Ste. Marie and St. Clair	392,000
	Third " "	530,000
	Fourth " "	600,000
	Fifth & Thereafter " "	677,000

Rates - Austin to St. Clair - 2¢ U.S./Mcf.

Minimum Bill - 90 per cent of Contract Quantity times the Rate.

- Emerson to Sault Ste Marie & St. Clair

Contract Quantities:

<u>Demand Charge</u> <u>U.S./Mcf/Month</u>	<u>Commodity Charge</u> <u>¢U.S./Mcf</u>
2.54	5.0

Option - Trans-Canada has the option following each of the first four contract years of substituting a total annual payment based on an average unit charge of 13.75¢ U.S./Mcf.

Minimum Bill

Monthly - The Demand Charge, plus the Commodity Charge times 75 per cent of the Contract Quantity.

Rates - Minimum Bill

Annual (if elected) 90 per cent of the effective Contract Quantity for that year at 13.75¢ U.S./Mcf.

Average Price

At 75 per cent Load Factor - 16.13¢ U.S./Mcf.

Under option, first four years - 13.75¢ U.S./Mcf, at 90 per cent effective Contract Quantity.

Additional Quantities

Trans-Canada may request that additional volumes, in excess of contract quantities, be transported.

Great Lakes may permit such delivery, if in its sole judgment, such delivery will not jeopardize its ability to meet its other delivery obligations.

The rate is 7¢ U.S./Mcf.

Summary of Pro Forma Gas Purchase Contract  
between  
Great Lakes Gas Transmission Company  
and  
Trans-Canada Pipe Lines Limited

Date - Precedent Agreement, 24 September 1965.

Effective - According to Precedent Agreement, within 30 days of acceptance by all parties of all regulatory authorizations requisite to Great Lakes Project.

Term - 25 years - The first year being from the date of initial delivery to 1 November 1968.

Type - Firm.

<u>Volumes</u>	<u>Contract Year</u>	<u>Contracted Demand Mcf/day</u>
	First	29,200
	Second	56,500
	Third	81,100
	Fourth and thereafter	37,600

<u>Rates</u>	<u>Contract Year</u>	<u>Demand Charge \$U.S./Mcf/Month</u>	<u>Commodity Charge \$U.S./Mcf</u>
	To 31 Dec. 1970	2.422	19.323
	1 Jan. 1971 - 31 Dec. 1975	2.706	19.745
	1 Jan. 1976 - 31 Dec. 1980	2.990	20.117
	1 Jan. 1981 - 31 Dec. 1985	3.274	20.539
	1 Jan. 1986 & thereafter	3.559	20.960

Minimum Bill

Monthly - The Demand Charge, plus the Commodity Charge times 75 per cent of the Contracted Demand.

Average Price at 75 Per Cent Load Factor

To 31 December 1970	29.939¢ U.S./Mcf
1 Jan. 1971 - 31 Dec. 1975	31.606 "
1 Jan. 1976 - 31 Dec. 1980	33.222 "
1 Jan. 1981 - 31 Dec. 1985	34.889 "
1 Jan. 1986 & thereafter	36.559 "

Additional (Overrun Gas)

At Great Lakes' request, Trans-Canada will make available to Great Lakes for resale as Overrun Service a volume of gas constituting the difference between the quantity Great Lakes is obligated to receive, transport and re-deliver to Trans-Canada under the Transportation Contract and the Scheduled Daily Delivery which Trans-Canada delivers, causes to be delivered or tenders to Great Lakes for transportation.

The rate for overrun volumes is 24¢ U.S./Mcf.

APPENDIX 4

Summaries of Contracts relating to the Great Lakes Project  
entered into by Trans-Canada Pipe Lines Limited and Great  
Lakes Gas Transmission Company with Companies in the United  
States

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Summary of Gas Sales Contract  
between  
Trans-Canada Pipe Lines Limited  
and  
Midwestern Gas Transmission Company

Date - 14 April 1960 and 14 October 1965  
Effective - 14 October 1965  
Term - 25 years from 15 December 1960  
Type - Export - Firm  
Volumes -

	Contract Demand Mcf/day at 15.025 psia	
	1960	1965
	<u>Contract</u>	<u>Supplemental*</u>
To 1 Nov.1965	200,000	
1 Nov.1965 - 1 Nov.1966	200,000	1,526
1 Nov.1966 - 1 Nov.1967	200,000	4,996
1 Nov.1967 & thereafter	200,000	5,848

\* Midwestern may on 8 months' notice increase the supplemental volumes up to 18,000 Mcf/day.

<u>Rates</u>	<u>Contract</u> Year	<u>Demand Charge</u> \$ Cdn./Mcf/Month	<u>Commodity Charge</u> ¢ Cdn./Mcf
First Five Years		2.30	20.75
Second Five Years		2.60	20.75
Third Five Years		2.91	20.75
Fourth Five Years		3.21	20.75
Fifth Five Years		3.52	20.75

Minimum Bill

Monthly - The Demand Charge, plus the Commodity Charge times 75 per cent of the Contract and Supplemental quantities.

Average Price at 75 Per Cent Load Factor

	<u>¢ Cdn./Mcf</u>
First Five Years	30.831
Second Five Years	32.146
Third Five Years	33.505
Fourth Five Years	34.820
Fifth Five Years	36.178

Summary of Pro Forma Gas Sales Contract  
between  
Trans-Canada Pipe Lines Limited  
and  
Midwestern Gas Transmission Company

<u>Date</u>	- Precedent Agreement - 24 September 1965		
<u>Effective</u>	- According to Precedent Agreement, within 30 days of acceptance by both parties of all regulatory authorizations		
<u>Term</u>	- 25 years from activation date		
<u>Type</u>	- Firm		
<u>Volumes</u>	- Maximum Daily Volume - 116,332 Mcf		
<u>Rates</u>	-	Demand Charge \$ US/Mcf/Month	Commodity Charge ¢ US/Mcf
	Initial Delivery to		
	31 Dec.1970	2.422	19.323
	1 Jan.1971-31 Dec.1975	2.706	19.745
	1 Jan.1976-31 Dec.1980	2.990	20.117
	1 Jan.1981-31 Dec.1985	3.274	20.539
	1 Jan.1986-& thereafter	3.559	20.960

Minimum Bill

Monthly - Demand Charge, plus the Commodity Charge times 75 per cent of Maximum Daily Volume.

Average Price at 75 Per Cent Load Factor

	¢ US/Mcf
To 31 Dec. 1970	29.938
1 Jan.1971 - 31 Dec.1975	31.606
1 Jan.1976 - 31 Dec.1980	33.222
1 Jan.1981 - 31 Dec.1985	34.889
1 Jan.1986 & thereafter	36.559

Summary of Pro Forma Gas Sales Contract  
between  
Trans-Canada Pipe Lines Limited  
and  
Midwestern Gas Transmission Company

<u>Date</u>	- Precedent Agreement - 15 October 1965
<u>Effective</u>	- According to Precedent Agreement, 1 November 1966 or as soon thereafter as regulatory authorizations permit
<u>Term</u>	- 25 years from 1 November 1966
<u>Type</u>	- Firm
<u>Volumes</u>	- Maximum Daily Volume - 26,534 Mcf/day
<u>Rates</u>	-

	Demand Charge \$ US/Mcf/Month	Commodity Charge ¢ US/Mcf
To 31 Dec.1970	2.422	19.323
1 Jan.1971-31 Dec.1975	2.706	19.745
1 Jan.1976-31 Dec.1980	2.990	20.117
1 Jan.1981-31 Dec.1985	3.274	20.539
1 Jan.1986 & thereafter	3.559	20.960

Minimum Bill

Monthly - The Demand Charge, plus the Commodity  
Charge times 75 per cent of the  
Maximum Daily Volume.

Average Price at 75 Per Cent Load Factor

	<u>¢ US/Mcf</u>
To 31 Dec. 1970	29.938
1 Jan.1971 - 31 Dec.1975	31.606
1 Jan.1976 - 31 Dec.1980	33.222
1 Jan.1981 - 31 Dec.1985	34.889
1 Jan.1986 & thereafter	36.559

Summary of Pro Forma Gas Purchase Contract  
between  
Michigan-Wisconsin Pipe Line Company  
and  
Trans-Canada Pipe Lines Limited

Date - Precedent Agreement, 24 September 1965.  
Effective - According to Precedent Agreement, within 30 days of acceptance by all parties of all regulatory authorizations requisite to Great Lakes Project.  
Term - From the date of initial delivery to 1 November 1968.  
Type - Import - Firm.  
Volume - 

<u>Contract Year</u>	<u>Contracted Demand</u>
First	113,000 Mcf/day
Second	63,000 Mcf/day

  
Rates - 

<u>Demand Charge</u> <u>\$U.S./Mcf/Month</u>	<u>Commodity Charge</u> <u>¢U.S./Mcf</u>
4.60	25.75

Cost to Trans-Canada at 100 per cent Load Factor shall not exceed the cost of such gas to Mich-Wis. from Midwestern at Marshfield, Wis., plus 3¢ U.S./Mcf.

Minimum Bill

Monthly - The Demand Charge, plus the Commodity Charge times 75 per cent of the Contracted Demand.

Average Price at 75 per cent Load Factor 45.91¢ U.S./Mcf (Subject to Mich-Wis. Marshfield price at 100 per cent Load Factor plus 3¢ as above).

Additional Quantities

Trans-Canada may request additional quantities of gas and Mich-Wis. will make such volumes available if it has any gas in excess of its own requirements and at the following rates:

During the Period:

1 December to 16 February	42.1¢ U.S./Mcf
16 February to 30 November	40.9¢ U.S./Mcf.



Summary of Pro Forma Gas Transportation  
and Purchase Contract  
between  
Michigan Consolidated Gas Company  
and  
Great Lakes Gas Transmission Company

- Date - Precedent Agreement, 24 September 1965
- Effective - According to Precedent Agreement, within 30 days of acceptance by all parties of all regulatory authorizations requisite to Great Lakes Project.
- Term - Transportation - 3 years  
Gas Purchases - 25 years, first year being from date of initial delivery to 1 November 1967.
- Type - Transportation and Gas Purchases - Firm.
- Volumes - Transportation (Austin Storage to Belle River Mills)

<u>Contract Year</u>	<u>Annual Volumes</u>	
	<u>Minimum Bcf</u>	<u>Maximum Bcf</u>
First	8	12
Second & Third*	8	12

\*Less quantity purchased from Great Lakes in Belle River Mills area each year.

Maximum Daily Volume - 50,000 Mcf

Gas Purchases

<u>Contract Year</u>	<u>Contracted Demand</u>
Second	20,000 Mcf/day
Third	40,000 Mcf/day
Fourth & thereafter	57,000 Mcf/day

- Rates - Transportation 2¢ U.S./Mcf.

Purchases

<u>Demand Charge</u> <u>\$U.S./Mcf/Month</u>	<u>Commodity Charge</u> <u>¢U.S./Mcf</u>
5.24	24.75

- Option - Michigan Consolidated has the option, following each of the second, third and fourth contract years, of substituting a total annual payment based on an average unit charge of 41.04¢ U.S./Mcf.

Rates

- Minimum Bill

Monthly - Demand Charge, plus Commodity Charge times 75 per cent of the Contract Demand.

Annual (if elected) - 90 per cent of the effective Contract Quantity for that year at 41.04¢ U.S./Mcf.

- Average Price

At 75 per cent Load Factor - 47.72¢ U.S./Mcf.

Under option, second, third and fourth years,  
- 41.04¢ U.S./Mcf, at 90 per cent effective Contract Quantity.

- Additional Quantities

Michigan Consolidated may request additional volumes and Great Lakes may sell, if in Great Lakes' sole judgment it has delivery capacity.

The rate is 31.00¢ U.S./Mcf.



APPENDIX 5

Summaries of Gas Sales Contracts between Trans-Canada Pipe  
Lines Limited and Canadian Distributors

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Summary of Gas Sales Contract  
between  
Trans-Canada Pipe Lines Limited  
and  
The Consumers' Gas Company

<u>Date</u>	-	17 November 1965		
<u>Effective</u>	-	This Agreement will not be effective unless and until the second stage of the Great Lakes Project has been completed.		
<u>Term</u>	-	5 years		
<u>Type</u>	-	Supplemental Seasonal - Seasonal Period		
<u>Volumes</u>	-		Maximum Annual Volumes (MMcf)	Average Daily Volumes (Mcf)
		<u>Period</u>		
		1 April of the second contract year of the seasonal gas sales contract dated 17 November 1965 Contract to 1 December following	15,000	61,475
		1 April of the third contract year to 1 December following	14,000	57,377
		15 April of the fourth contract year to 16 November following	13,000	60,748
		1 May of the fifth contract year to 1 November following	12,000	77,922
		1 May of the sixth contract year to 1 November following	11,000	71,429
<u>Rate</u>	-	36¢ per Mcf		
		<u>Minimum Bill</u> - 85 per cent of Maximum Annual Volume elected by Consumers' for each period.		

Summary of Gas Sales Contract Amendment  
between  
Trans-Canada Pipe Lines Limited  
and  
The Consumers' Gas Company

<u>Date</u>	-	17 November 1965	
<u>Effective</u>	-	Effective from the date of completion of the first stage of the Great Lakes Project and the commencement of deliveries under the gas sales contract dated 17 November 1965.	
<u>Term</u>	-	To - 1 November 1984	
<u>Type</u>	-	Amends points of delivery and rates under the Third Gas Sales Contract.	
<u>Volumes</u>	-	No Change	
<u>Rates</u>	-	<u>Delivery Point</u>	<u>¢/Mcf</u>
		Current Rate - Lisgar, Ontario	45.0
		New Rate - Storage Connection Lambton County	43.0
		- Lisgar, Ontario, and other Central Zone delivery points	45.0

Summary of Gas Sales Contract  
between  
Trans-Canada Pipe Lines Limited  
and  
The Consumers' Gas Company

Date - 17 November 1965

Effective - 1 November 1966, contingent on Great Lakes Project.

Term - 25 years from 1 November 1966

Type - Seasonal - part interruptible.

<u>Volumes</u>	<u>Seasonal Volumes</u>		<u>Total Annual Volume</u> MMcf
	<u>Winter Period</u> 1 Nov.-1 Mar. MMcf	<u>Summer Period</u> 1. Apr.-31 Oct. MMcf	
<u>Contract Year</u>			
First	5,000	5,000	10,000
Second	15,000	15,000	30,000
Third	16,000	16,000	32,000
Fourth	20,000	20,000	40,000
Fifth	24,000	24,000	48,000
Sixth	28,000	28,000	56,000
Seventh and thereafter	37,500	37,500	75,000

Trans-Canada may curtail or interrupt deliveries on any day up to 60 per cent of the average daily delivery volume as follows:

Winter Period - To the extent Trans-Canada has delivered gas in excess of the winter period average day delivery volume times the number of days elapsed.

Summer Period - To the extent Trans-Canada is not deficient by more than 5 per cent of the Annual Contract Volume.

Deficiency Recovery - Deficiency gas may be made up in the following contract year after minimum annual volumes for such succeeding contract year have been delivered.

Rate - 43¢ per Mcf

Minimum Bill - 75 per cent of each seasonal period volume.



Summary of Gas Sales Contract Amendments  
between  
Trans-Canada Pipe Lines Limited  
and  
The Consumers' Gas Company

Date - 17 November 1965

Amendment to the Second Gas Sales Contract - 30 October 1963

Effective - 1 November 1970

Term - To 1 November 1983

Type - Firm

Volumes - Contracted Demand Volumes to be reduced to 18,000 Mcf/day from 33,000 Mcf/day for the balance of the term of the Contract.

Rate - No change

Amendment to the Third Gas Sales Contract - 26 October 1964

Effective - 1 November 1970

Term - To 1 November 1984

Type - Seasonal - Limited Interruption

Volumes - Maximum Annual Delivery Obligation

<u>Period</u>	<u>From</u>	<u>Amended To</u>
1 Nov./64 - 31 Oct./65	-	No Change -
1 Nov./65 - 31 Oct./66 and thereafter	15,000 MMcf	
1 Nov./65 - 1 Nov./70		15,000 MMcf
1 Nov./70 and thereafter		20,475 MMcf
<u>Minimum Annual Billing Quantity</u>		
1 Nov./64 - 31 Oct./65	-	No Change -
1 Nov./65 - 31 Oct./66 and thereafter	9,000 MMcf	
1 Nov./65 - 1 Nov./70		11,250 MMcf
1 Nov./70 and thereafter		15,365.25MMcf

APPENDIX 5  
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Seasonal Volumes

	<u>Winter Period</u>	<u>Summer Period</u>	<u>Total Yearly</u>
	1 Nov.-31 Mar.	1 Apr.-31 Oct.	
	MMcf	MMcf	MMcf
	<u>From</u> <u>To</u>	<u>From</u> <u>To</u>	<u>From</u> <u>To</u>
To 1 Nov./70	-	No Change	-
After 1 Nov./70	7,500 - 10,238	7,500 - 10,237	15,000 - 20,475

ates - No Change

Summary of Gas Sales Contract  
between  
Trans-Canada Pipe Lines Limited  
and  
Lakeland Natural Gas Limited

Date - 14 December 1965

Effective - 1 November 1966, contingent on Great Lakes Project.

Term - 20 years from 1 November 1966

Type - Firm

<u>Volumes</u>	<u>Contract Year</u>	<u>Contracted Demand Mcf/day</u>
	First	1,500
	Second	4,000
	Third	7,000
	Fourth	10,000
	Fifth	12,000
	Sixth	14,000
	Seventh and thereafter	16,000

<u>Rate</u>	<u>Rate Schedule</u>	<u>Demand Charge \$/Mcf/Month</u>	<u>Commodity Charge ¢/Mcf</u>
General	(E.D.7)	5.05	31.5
Service			
Industrial	(E.I.F.)	3.78	31.5

Minimum Bill

Monthly - Demand Charge

Annual - The sum of the Demand Charges, plus the  
Commodity Charge times 90 per cent of  
the Contracted Demand in effect for  
such year.

Average Price at 90 per cent Load Factor

	<u>Rate Schedule</u>	
General	(E.D.7)	49.9¢/Mcf
Service		
Industrial	(E.I.F.)	50.8¢/Mcf

Summary of Gas Sales Contract  
between  
Trans-Canada Pipe Lines Limited  
and  
Northern and Central Gas Company Limited

Date - 13 December 1965

Effective - 1 November 1966, contingent on Great Lakes Project

Term - 20 years from 1 November 1966

Type - Firm

<u>Volumes</u>	<u>Contract Year</u>	<u>Contracted Demand Mcf/day</u>			
		<u>Western Zone</u>	<u>Northern Zone</u>	<u>Unallocated</u>	<u>Total</u>
	First	5,500	10,000	6,000	21,500
	Second	7,000	12,000	20,000	39,000
	Third	8,500	14,000	26,000	48,500
	Fourth	10,000	16,000	30,000	56,000
	Fifth	11,500	18,000	38,500	68,000
	Sixth	13,000	20,000	40,000	73,000
	Seventh & thereafter	14,500	22,000	40,000	76,500

Northern and Central to notify Trans-Canada at least a year in advance of the allocation to Western or Northern Zones of Unallocated Contracted Demand Volumes.

<u>Rates</u>	-	<u>Schedule</u>	<u>Demand Charge</u> <u>\$/Mcf/Month</u>	<u>Commodity Charge</u> <u>¢/Mcf</u>
		<u>Western Zone</u>		
		General (W.D. 7)	2.90	26.0
		Service		
		Indus- (W.I. F)	2.18	26.0
		trial		
		<u>Northern Zone</u>		
		General (N.D. 7)	4.10	31.0
		Service		
		Indus- (N.I. F)	3.07	31.0
		trial		

Minimum Bill

Monthly - The Demand Charge

Annual - The sum of the Demand Charges under both rate schedules, plus the Commodity Charge times 90 per cent of the Contracted Demand in effect for such contract year.



Average Price at 90 per cent Load Factor

<u>Rate Schedule</u>	<u>¢/Mcf</u>
General Service (W.D.7)	36.6
Industrial (W.I.F)	34.0
General Service (N.D.7)	46.0
Industrial (N.I.F)	42.2

Summary of Gas Sales Contract  
between  
Trans-Canada Pipe Lines Limited  
and  
Northern and Central Gas Company Limited

Date - 13 December 1965

Effective - 1 November 1966, contingent on Great Lakes Project

Term - 20 years from 1 November 1966

Type - Firm

Volumes -

<u>Contract Year</u>	<u>Contracted Demand</u>
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First and thereafter	500 Mcf/day
----------------------	-------------

<u>Rate</u>	<u>Rate Schedule</u>	<u>Demand Charge \$/Mcf/Month</u>	<u>Commodity Charge ¢/Mcf</u>
-	General (C.D.7) Service	4.40	31.5
	Indus- (C.I.F) trial	3.30	31.5

Minimum Bill

Monthly - Demand Charge

Annual - First Contract Year - The sum of the Demand Charges under both rate schedules, plus the Commodity Charge times 75 per cent of the Contracted Demand.

Second and Succeeding Contract Years - The sum of the Demand Charges under both rate schedules, plus the Commodity Charge times 90 per cent of the Contracted Demand.

Average Price

<u>Schedule</u>	<u>75 per cent Load Factor</u>	<u>90 per cent Load Factor</u>
General (C.D.7) Service	52.6¢/Mcf	47.6¢/Mcf
Indus- (C.I.F) trial	46.0¢/Mcf	43.5¢/Mcf

Summary of Gas Sales Contract  
between  
Trans-Canada Pipe Lines Limited  
and  
Northern and Centreal Gas Company Limited

Date - 13 December 1965  
Effective - 1 November 1966, contingent on Great Lakes Project  
Term - 1 November to the next succeeding 1 April each year  
from 1 November 1966 to and including 1 November  
1970

Type - Temporary Winter Service

<u>Volumes</u>	-	<u>Contract Year</u>	<u>Western Zone</u> Mcf	<u>Northern Zone</u> Mcf
		First	800,000	800,000
		Second	800,000	800,000
		Third	800,000	800,000
		Fourth	800,000	800,000
		Fifth	800,000	800,000

Maximum Daily Delivery Obligation:

8,000 Mcf/day in each Zone

<u>Rates</u>	-	<u>Western Zone</u>	<u>Northern Zone</u>
		37.0¢/Mcf	41.0/Mcf

Minimum Bill - Total Contract Volume.

Summary of Diversion Agreement  
between  
Trans-Canada Pipe Lines Limited  
and  
Northern and Central Gas Company Limited

<u>Date</u>	- 13 December 1965
<u>Effective</u>	- 13 December 1965
<u>Term</u>	- As per the Central Zone Contract dated 24 January 1957 To - 1 November 1978
<u>Type</u>	- Diversion Agreement between Eastern and Central Zones re Firm Contracts
<u>Volumes</u>	- "Valley Gas" in respect of Firm Contracts in Seller's Central and Eastern Zones and at Seller's direction
<u>Rates</u>	- Gas diverted from the Central Zone to the Eastern Zone shall be charged for at the Central Zone Contract Price plus 2.5¢ per Mcf  Gas diverted from the Eastern Zone to the Central Zone shall be charged for at the Eastern Zone Contract Price plus 2.5¢ per Mcf



Summary of Gas Sales Contract  
between  
Trans-Canada Pipe Lines Limited  
and  
Union Gas Company of Canada Limited

- Date - 15 May 1965
- Effective - Trans-Canada and Union agree that this gas sales contract shall become effective 1 November 1966 and shall apply thereafter or until the first stage of the Great Lakes Project has been completed and delivery of gas commences under the Great Lakes Contract (dated 1 October 1965)
- Term - 20 years from 1 November 1966
- Type - Annual - Seasonal
- Volumes -

<u>Contract Year</u>	<u>Maximum Annual Volumes MMcf</u>
First	2,989.8
Second	7,227.0
Third	8,833.0
Fourth	10,840.5
Fifth	11,643.5
Sixth and thereafter	13,067.0

Commencing in the second contract year 50 per cent of the Maximum Annual Volume is contemplated to be delivered in each of the winter period (1 Nov. - 31 Mar.) and summer period (1 Apr. - 31 Oct.)

- Rates - To 31 October 1969 43¢/Mcf Delivered  
After 31 October 1969 45¢/Mcf Delivered

Minimum Bill

75 per cent of the Maximum Annual Volume

Summary of Gas Sales Contract  
between  
Trans-Canada Pipe Lines Limited  
and  
Union Gas Company of Canada Limited

- Date - 1 October 1965 "Great Lakes Contract"
- Effective - 1 November 1966 contingent on Great Lakes Project
- Term - 19 years from last day of first contract year -  
(First contract year is from date of initial  
delivery to next 1 November)

Type - Annual sale - part interruptible

<u>Volumes</u>		Maximum Annual Volumes MMcf
	<u>Contract Year</u>	
	First	25,000
	Second	30,000
	Third	36,000
	Fourth	42,000
	Fifth	48,000
	Sixth	54,000
	Seventh and thereafter	54,000

Option for Union to indicate, before 1 April in each year, the quantity of gas required for the next contract year within limits of maximum contract quantity and 85 per cent thereof.

Monthly take to be 1/12 of annual volume indicated by Union

Trans-Canada may curtail or interrupt deliveries at any time, unless Trans-Canada is then cumulatively deficient by 5 per cent or more of the Maximum Annual Volume in effect for that contract year.

Deficiency gas may be made up in the following contract year at the rate of 1/12 of the total deficiency per month without further payment by Union.

<u>Rates</u>	- <u>Contract Year</u>	<u>¢/Mcf</u>
	First	39.15
	Second	39.45
	Third	39.75
	Fourth	40.10
	Fifth	40.40
	Sixth	40.70
	Seventh and thereafter	40.85

Minimum Bill

First Contract Year	-	75 per cent of Maximum Annual Volume
Second Contract Year and thereafter	-	85 per cent of Maximum Annual Volume

(When deliveries commence under this contract, this contract will replace the contract between the two parties dated 15 May 1965.)

<u>Delivery Points</u>	-	At or near Dawn Compressor Station site of Union, and such other points of interconnection between the facilities of Union and Trans-Canada as may be mutually agreed upon.
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Summary of Gas Sales Contract  
between  
Trans-Canada Pipe Lines Limited  
and  
Union Gas Company of Canada Limited

<u>Date</u>	-	2 October 1965	
<u>Effective</u>	-	This agreement will not be effective between the parties unless and until the Great Lakes Project has been completed and unless and until deliveries commence under the "Great Lakes Contract" dated 1 October 1965.	
<u>Term</u>	-	To the end of sixth contract year of the "Great Lakes Contract" dated 1 October 1965.	
<u>Type</u>	-	Supplemental Annual Sale	
<u>Volumes</u>	-	<u>Contract Year of "Great Lakes Contract"</u>	<u>Maximum Annual Volumes MMcf</u>
		Second	19,500
		Third	14,400
		Fourth	9,300
		Fifth	7,200
		Sixth	8,100
<p>Union must have elected to take the maximum volumes under contract for delivery to Lisgar or Dawn before deliveries under this contract will be made. (Contracts dated 18 January 1955, 27 May 1964 and "Great Lakes Contract" 1 October 1965.)</p>			
<u>Rates</u>	-	36¢ per Mcf	
		<u>Minimum Bill</u>	
		Second year of "Great Lakes Contract"	- 75 per cent of contract quantity
		Thereafter	- 85 per cent of contract quantity



Summary of Gas Sales Contract  
between  
Trans-Canada Pipe Lines Limited  
and  
Union Gas Company of Canada Limited

- Date - 1 November 1965
- Effective - This Agreement shall only become operative if and when the 1965 Contract shall become operative, and any termination by either party of the 1965 Contract shall be a termination of this Agreement.
- Term - To 31 October 1975 or at Trans-Canada's option until Trans-Canada commences transportation through its own pipe line from Dawn to Lisgar, Ontario.
- Type - Transportation
- Volumes - Maximum Daily Demand Obligation

50,000 Mcf

Union may fulfil its delivery obligation by displacement of gas from third parties or from purchases made from Trans-Canada by Union under any of the gas sales contracts in effect at the time.

- Rate - Demand Charge 33.6¢/Mcf/Month

Commodity Charge

Dawn to Lisgar	1.5¢/Mcf
Lisgar to Dawn	2.0¢/Mcf

Average price per Mcf at 100 per cent Load Factor:

Dawn to Lisgar	2.59¢
Lisgar to Dawn	3.50¢

Summary of Agreement  
between  
Trans-Canada Pipe Lines Limited  
and  
Union Gas Company of Canada Limited

Date - 1 November 1965

Effective - This agreement has been entered into to facilitate the completion of the Great Lakes Project as contemplated in the Gas Sales Contract dated 1 October 1965.

If Union is not satisfied that deliveries will commence on or about 1 November 1966 under the 1 October 1965 Contract, Union may, on or before 31 March 1966, give notice terminating this agreement as to the period 1 April 1966 to 1 November 1966, and cancelling the provisions regarding replacement of volumes reduced prior to 1 April 1966.

Type - Curtailment of Deliveries: Under Gas Sales Contracts dated 18 January 1955 and 27 May 1964.

<u>Volumes</u>	- Reduction of Deliveries Under Each Contract (Bcf)	Total Amount of Reduction of Deliveries (Bcf)
----------------	---	---

	<u>1955 Contract</u>	<u>1964 Contract</u>	
To 1 Nov./64	.558		.558
1 Nov./64- 1 Nov./65	2.073		2.073
1 Nov./65- 1 Apr./66	2.000		2.000

1 Apr./66- 1 Nov./66	.750	2.50	3.250
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(All curtailments during this period shall be applied first to reduction of deliveries under the 1964 Contract to a maximum of 2.50 Bcf)

Term - To 1 November 1966

If Union has not given notice terminating this agreement as provided, the following conditions will apply:

Commencing 1 November 1967, Trans-Canada agrees to deliver to Union all volumes reduced attributable to the 1955 contract. Such deliveries shall be completed by 1 November 1969 at the rate of one-half of the total volume each contract year, insofar as possible at the rate of  $1/24$  per month. Deliveries shall not exceed  $1/20$  of the total in any month.

If Union requests Trans-Canada to deliver volumes of gas curtailed under the 1964 Contract, Trans-Canada may at its sole discretion deliver to Union all or any part of such volumes requested during the period 1 November 1967 to 1 November 1969.

Union agrees that, commencing 1 November 1966, the provisions relating to curtailment or interruption under the 1955 and 1964 contracts shall apply as if the reductions in delivery contemplated herein had not taken place.

Trans-Canada agrees to deliver and Union agrees to accept a minimum volume of 45,000 Mcf/d during the period 1 November 1965 to 1 April 1966.

Rates - Not Applicable.

TRENDS IN THE GROWTH OF INITIAL  
ESTABLISHED RESERVES OF GAS  
IN CANADA  
(FULLY APPRECIATED)

INITIAL ESTABLISHED RESERVES — TCF

TOTAL CANADA

ALBERTA

BRITISH COLUMBIA

OTHER CANADIAN

1995

1993

1991

1989

1987

1985

1983

1981

1979

1977

1975

1973

1971

1969

1967

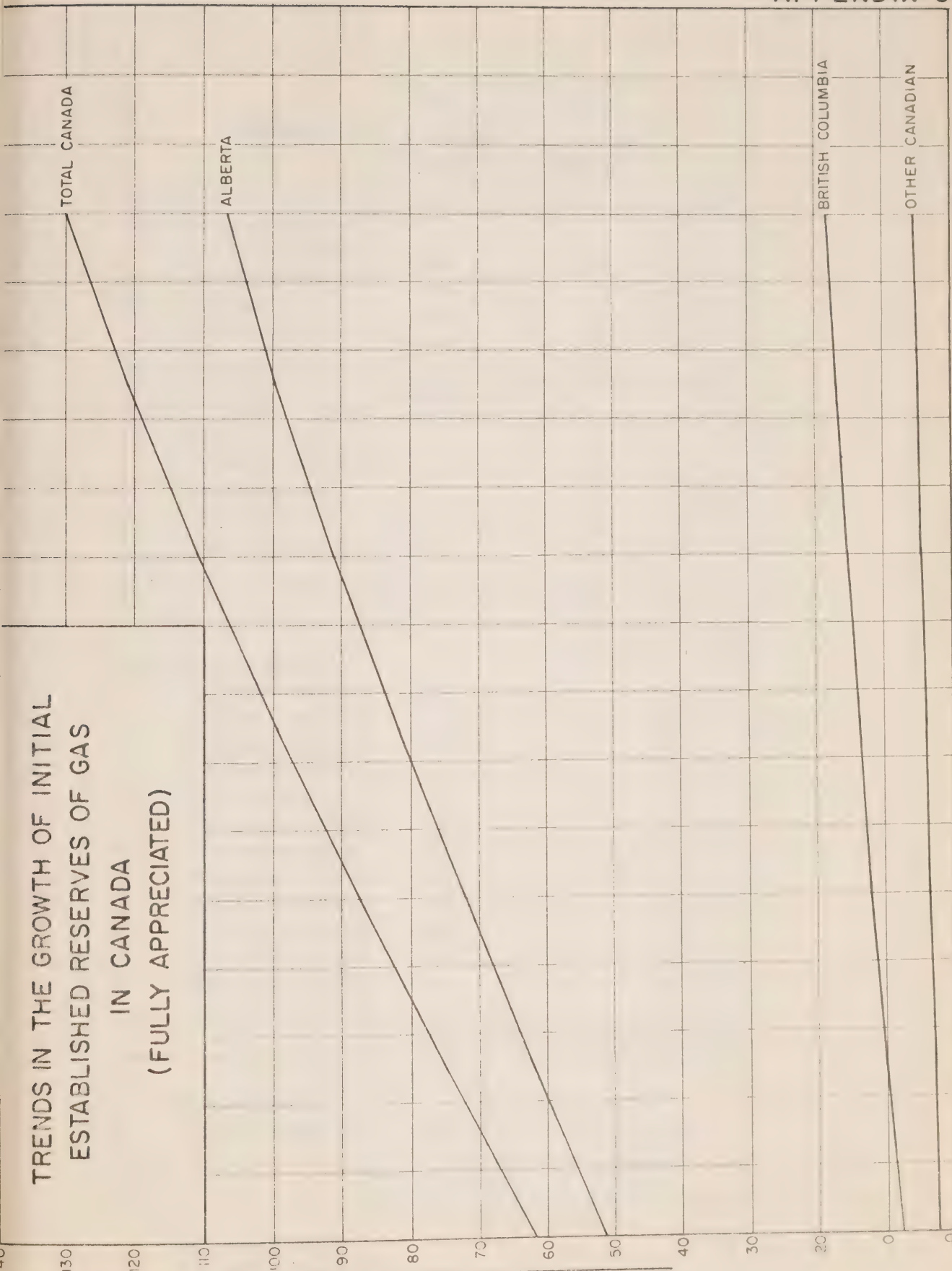
1965

DATE — YEAR END

NATIONAL ENERGY BOARD

JULY 1966

APPENDIX 6







NATIONAL ENERGY BOARD  
ESTIMATED RESERVES NECESSARY TO SUPPLY  
FUTURE NATURAL GAS REQUIREMENTS OF CANADA PLUS AUTHORIZED EXPORTS  
AND THE CURRENT APPLICATION

APPENDIX 7

1,000 BTU'S PER CUBIC FOOT

(1) MARKET AREA	(2) PERIOD OF REQUIREMENT	(3) DELIVERIES DURING PERIOD TO MEET ESTIMATED DEMAND BCF	(4) TERMINAL PEAK DAY RATE FN MMCFD	(5) CORRECTED RESERVES DELIVERABILITY RATIO OF BCF/MMCFD	(6) RECOVERIES REQUIRED FOR TERMINAL PEAK OPN BCF	(7) TOTAL GAS IN PLACE NECESSARY TO MEET REQUIRE- MENTS BCF	(8) RATIO OF MARKETABLE GAS TO GAS IN PLACE K	(9) MARKETABLE GAS NECESSARY TO MEET REQUIREMENTS BCF	(10) TO BE SUPPLIED FROM AVAILABLE RESERVES BCF	(11) TO BE SUPPLIED FROM FUTURE RESERVES BCF
<b>A. CANADIAN - CURRENT</b>										
(1) BRITISH COLUMBIA (NET)	1 JAN/66 TO 31 DEC/90	2,385 (1)	-	-	-	-	-	2,385	2,385	- (1)
(2) EAST KOOTENAY	1 JAN/66 TO 31 DEC/90	88 (1)	-	-	-	-	-	88	88	- (2)
(3) ALBERTA	1 JAN/66 TO 31 DEC/90	6,183 (11)	-	-	-	-	-	6,183	6,183	- (3)
(4) CANADA, EAST OF ALBERTA	1 JAN/66 TO 31 DEC/90	14,025 (1)	-	-	-	-	-	14,025	14,025	- (4)
TOTAL		22,681						22,681	22,681	
<b>B. CANADIAN - FUTURE</b>										
(5) BRITISH COLUMBIA (NET)	1 JAN/66 TO 31 DEC/95	5,176 (11)	1,338	3.0	4,014	9,190	0.67	7,995	2,385	5,610 (5)
(6) EAST KOOTENAY	1 JAN/66 TO 31 DEC/95	134 (11)	34	5.6	190	324	0.65	275	88	167 (6)
(7) ALBERTA	1 JAN/66 TO 31 DEC/95	11,458 (11)	2,746	3.4	9,336	20,794	0.65	17,675	6,183	11,492 (7)
(8) CANADA, EAST OF ALBERTA	1 JAN/66 TO 31 DEC/95	29,814 (11)	4,965	4.3	21,350	51,164	0.65	43,469	14,025	29,464 (8)
TOTAL		46,582						69,434	22,681	46,753
<b>C. AUTHORIZED EXPORTS</b>										
(9) TRANS-CANADA QL-1 (EMERSON)	1 JAN/66 TO 14 MAY/81	1,072	224	-	-	-	-	1,072	1,072	- (9)
(10) TRANS-CANADA QL-2 (NIAGARA)	1 JAN/66 TO 31 DEC/66	21	-	-	-	-	-	21	21	- (10)
(11) ALBERTA & SOUTHERN QL-3 (KINGSGATE)	1 JAN/66 TO 31 OCT/86	3,469	486	-	-	-	-	3,469	3,469	- (11)
(12) WESTCOAST QL-4 (KINGSGATE)	1 JAN/66 TO 10 DEC/81	908	161	-	-	-	-	908	908	- (12)
(13) CANADIAN MONTANA QL-5 (CARBOSTON)	1 JAN/66 TO 31 OCT/86	245	38	-	-	-	-	245	245	- (13)
(14) NIAGARA GAS QL-6 (CORNWALL)	1 JAN/66 TO 30 JUNE/80	67	17	-	-	-	-	67	67	- (14)
(15) CANADIAN MONTANA QL-6 (ADEN)	1 JAN/66 TO 14 MAY/74	125	96	-	-	-	-	125	125	- (15)
(16) ALBERTA & SOUTHERN QL-16 (KINGSGATE)	1 JAN/66 TO 31 OCT/89	1,711	240	-	-	-	-	1,711	1,711	- (16)
(17) CANADIAN MONTANA QL-17 (CARBOSTON)	1 JAN/66 TO 31 OCT/89	116	25	-	-	-	-	116	116	- (17)
(18) TRANS-CANADA QL-18 (EMERSON)	1 JAN/66 TO 31 OCT/89	1,205	144	-	-	-	-	1,205	1,205	- (18)
(19) TRANS-CANADA QL-19 (PHILIPSBURG)	1 JAN/66 TO 31 OCT/89	139	18	-	-	-	-	139	139	- (19)
(20) WESTCOAST (SUMAS)	1 JAN/66 TO 3 NOV/77	1,277	315	-	-	-	-	1,277	1,277	- (20)
TOTAL		10,355						10,355	10,355	-
<b>D. EXPORT APPLICATIONS</b>										
(21) TRANS-CANADA (EMERSON)	1 NOV/67 TO 31 OCT/92	768 (iv)	88	-	-	-	-	768	768	- (21)
TOTAL		768						768	768	

(1) VOLUMES EQUIVALENT TO 25 TIMES THE FOURTH YEAR LEVEL OF DEMAND - 25A4

(11) VOLUMES PRESENTLY COMMITTED TO THE ALBERTA MARKET - EXCEEDS 25A4

(11) SUM OF THE TOTAL ANNUAL REQUIREMENTS DURING THE THIRTY YEAR PERIOD 1 JAN/66 TO 31 DEC/95

(iv) EXCLUSIVE OF GAS TO BE RETURNED TO CANADA



## NOTES TO APPENDIX 7

This table shows the amount of reserves required for Canadian markets and existing export commitments and the export volumes which are the subject of the application dealt with in this report.

1. Natural gas requirements of Canada (lines 1 to 4) to be supplied from "available" reserves were computed for a 25-year period.

The total deliveries appearing in Column (3) were obtained from the pertinent columns in Appendix 8 by multiplying the annual requirement estimated for the year 1969 by 25. The incremental demand beyond the 1969 level, for the years 1970 to 1990 would be supplied from future reserves.

2. Future natural gas requirements of Canada (lines 5 to 8) to be supplied from available and future reserves were computed for a 30-year period.

The total deliveries for the 30-year period, shown in Column 3, were taken from the totals appearing in the appropriate columns in Appendix 8. These total deliveries comprise the deliveries to be supplied from available reserves (See Note 1), the volumes to supply the incremental demand beyond the 1969 level for the period 1970 to 1990, and the volumes necessary to supply the total requirements for the period 1991 to



1995 inclusive.

3. In the case of exports (lines 9 to 20 inclusive), the deliveries shown in Column 3 are the total amounts of the export authorizations, less the cumulative exports thereunder up to 31 December 1965. The requested export volumes which are the subject of this application are shown on line 21.
4. Terminal peak-day rates listed in Column 4 for Canadian requirements were based on the peak-day rate shown in Appendix 8 for 1969, after adjustment for peak-shaving and underground storage.
5. The corrected deliverability ratios (CF) shown in Column 5 were obtained from a deliverability schedule using a computer program, with the exception of the ratio for Alberta which was obtained from the Alberta Board Report 64-11 dated November 1964.
6. Figures in Column 6 were obtained by multiplying Column 4 by Column 5.
7. Figures for total gas in place necessary to meet requirements, shown in Column 7, were obtained by adding the figures in Columns 3 and 6.
8. The ratios of marketable gas to gas in place, shown in Column 8, are obtained from individual field data and are weighted averages.

9. In Section B of the Appendix, figures for marketable gas necessary to meet requirements, shown in Column 9, were obtained by multiplying Column 7 by Column 8.
10. Column 10 shows the amount of total requirements listed under Column 9 which would be supplied from available reserves.
11. Column 11 shows the portion of the total Canadian requirements over a period of thirty years (Column 9) which would be supplied from future reserves.



NATIONAL ENERGY BOARD  
CANADIAN NATURAL GAS REQUIREMENTS  
1,000 BTU'S PER CUBIC FOOT

APPENDIX 6

(1) YEAR	(2) (3) (4) EAST KOOTENAY REQUIREMENTS			(5) (6) (7) BRITISH COLUMBIA LESS EAST KOOTENAY			(8) (9) (10) TOTAL ALBERTA REQUIREMENTS INCLUDING FUEL AND LOSSES			(11) (12) (13) CANADIAN REQUIREMENTS EAST OF ALBERTA INCLUDING FUEL AND LOSSES			(14) PEAK SHAVING AND STORAGE EAST OF ALBERTA	(15) (16) (17) CANADIAN REQUIREMENTS EAST OF ALBERTA AFTER PEAK SHAVING		
	ANNUAL BCF	PEAK MMCFD	LF %	ANNUAL BCF	PEAK MMCFD	LF %	ANNUAL BCF	PEAK MMCFD	LF %	ANNUAL BCF	PEAK MMCFD	LF %	MMCFD	ANNUAL BCF	PEAK MMCFD	LF %
1966	1.2	7	47.0	83.8	403	57.0	208.1	1,030	55.4	425.8	2,116	55.1	742	425.8	1,374	84.8
1967	1.8	9	54.9	101.0	471	58.8	216.2	1,051	55.8	468.2	2,318	55.3	948	468.2	1,470	80.0
1968	3.0	14	58.7	110.0	510	59.2	238.0	1,155	56.5	518.8	2,351	55.8	948	518.8	1,603	88.6
1969	3.5	15	60.0	95.4	471	55.5	247.3	1,200	56.6	561.0	2,749	55.9	1,036	561.0	1,713	89.7
1970	3.9	18	59.4	100.3	497	55.4	254.8	1,228	56.6	601.5	2,928	56.4	1,116	601.5	1,812	91.1
1971	4.0	19	57.7	107.0	530	55.5	262.6	1,268	56.7	636.4	3,100	56.3	1,210	636.4	1,890	90.7
1972	4.1	19	59.1	116.2	570	56.0	284.0	1,350	57.6	672.4	3,267	56.4	1,210	672.4	2,057	89.6
1973	4.1	20	56.1	122.2	598	56.0	292.1	1,393	57.4	705.6	3,422	56.5	1,226	705.6	2,196	88.0
1974	4.2	20	57.5	128.3	628	56.0	300.9	1,437	57.4	742.4	3,597	56.5	1,286	742.4	2,311	89.1
1975	4.2	20	57.5	134.2	655	56.2	309.6	1,477	57.4	780.7	3,778	56.7	1,352	780.7	2,424	88.3
1976	4.3	21	56.1	140.3	687	56.0	318.9	1,520	57.5	816.7	3,943	56.7	1,400	816.7	2,543	88.2
1977	4.3	21	56.1	146.1	718	55.8	328.3	1,560	57.7	851.7	4,110	56.8	1,441	851.7	2,669	87.5
1978	4.4	22	54.8	152.5	749	55.8	338.1	1,601	57.8	889.5	4,286	56.9	1,497	889.5	2,789	87.3
1979	4.4	22	54.8	159.3	783	55.7	348.4	1,652	57.7	926.0	4,468	56.8	1,556	926.0	2,912	87.2
1980	4.5	22	56.1	166.1	819	55.6	359.0	1,703	57.7	962.6	4,647	56.8	1,619	962.6	3,028	87.0
1981	4.6	23	54.9	172.6	852	55.5	370.0	1,755	57.7	1,000.1	4,820	57.0	1,677	1,000.1	3,143	87.2
1982	4.6	24	52.5	179.2	885	55.5	395.0	1,863	58.1	1,037.3	4,994	56.8	1,734	1,037.3	3,260	87.4
1983	4.7	24	53.6	186.0	931	54.8	406.8	1,918	58.2	1,075.2	5,171	56.9	1,795	1,075.2	3,378	87.4
1984	4.8	25	52.6	193.0	956	55.4	419.1	1,968	58.4	1,114.4	5,352	57.1	1,867	1,114.4	3,485	87.6
1985	4.8	25	52.6	200.3	994	55.3	431.9	2,035	58.3	1,153.4	5,527	57.1	1,911	1,153.4	3,616	87.4
1986	4.9	26	51.7	207.1	1,029	55.2	445.1	2,095	58.3	1,193.6	5,713	57.2	1,974	1,193.6	3,739	87.5
1987	5.0	26	52.7	214.0	1,063	55.3	458.8	2,155	58.4	1,233.9	5,896	57.3	2,032	1,233.9	3,864	87.5
1988	5.1	27	51.6	220.8	1,096	55.3	473.1	2,225	58.2	1,273.4	6,091	57.4	2,096	1,273.4	3,995	87.3
1989	5.2	28	50.9	227.8	1,129	55.9	487.8	2,290	58.4	1,317.6	6,270	57.5	2,151	1,317.6	4,119	87.8
1990	5.3	28	51.9	234.8	1,164	55.3	502.0	2,360	58.4	1,361.0	6,466	57.6	2,202	1,361.0	4,264	87.4
1991	5.4	29	51.0	241.6	1,197	55.3	518.6	2,425	58.6	1,405.0	6,658	57.8	2,273	1,405.0	4,385	87.8
1992	5.6	31	49.5	248.4	1,231	55.3	535.2	2,508	58.5	1,450.5	6,859	57.9	2,335	1,450.5	4,524	87.8
1993	5.7	32	48.8	255.5	1,267	55.2	551.9	2,586	58.5	1,496.9	7,057	58.0	2,393	1,496.9	4,664	87.9
1994	5.9	33	49.0	262.5	1,303	55.2	569.1	2,665	58.6	1,546.3	7,268	58.2	2,452	1,546.3	4,816	88.4
1995	6.0	34	48.4	269.7	1,338	55.3	586.8	2,746	58.6	1,595.4	7,485	58.5	2,520	1,595.4	4,965	88.0
TOTAL	133.5			5,176.1			11,459.3			29,814.3				29,814.3		

• LOAD FACTOR - ANNUAL DEMAND DIVIDED BY 365 TIMES PEAK DAY EXPRESSED AS A PER CENT.





## NOTES TO APPENDIX 8

This table shows the natural gas requirements of East Kootenay, British Columbia less East Kootenay, Alberta and Canada East of Alberta for the 30-year period 1966 to 1995 inclusive.

1. Columns 2, 3 and 4 show the forecast of annual and peak-day requirements, and the resulting load factors, of the East Kootenay area of British Columbia.
2. Columns 5, 6 and 7 show the forecast of annual and peak-day requirements, and the resulting load factors, of British Columbia exclusive of the East Kootenay region. The East Kootenay requirements were based on a separate estimate prepared by the Board staff and were subtracted in order that Columns 5, 6 and 7 might show the British Columbia requirements to be served by reserves in British Columbia and in the Peace River Region of Alberta.
3. Columns 8, 9 and 10 are a forecast of the annual and peak-day requirements, and the resulting load factor of Alberta. These values were obtained from Appendix 13, with the addition of an amount of four per cent of the volumes there shown to cover pipe line fuel and losses.
4. Columns 11, 12 and 13 are a forecast of the annual and peak-day requirements, and the resulting load factor,

of all Canadian markets east of Alberta. These were obtained from Appendix 13 and include an amount for pipe line fuel and losses east of British Columbia, less the amount assigned to Alberta.

5. Column 14 lists the estimated total storage and peak-shaving requirements east of Alberta. Separate forecasts were made by the Board's staff for Saskatchewan, Manitoba, Ontario and Quebec. These were combined to give the results shown in Column 14.
6. Column 15 is the same as Column 11. Column 16 was obtained by subtracting Column 14 from Column 12. Column 17 shows the resulting load factors.

NATIONAL ENERGY BOARD  
FORECAST MARKET DEMANDS TO BE SERVED  
BY TRANS-CANADA  
(1,000 BTU's PER CUBIC FOOT)

	1966			1967			1968			1969		
	Annual Bcf (2)	Peak Day MMcfd (3)	Annual Bcf (4)	Peak Day MMcfd (5)	Annual Bcf (6)	Peak Day MMcfd (7)	Annual Bcf (8)	Peak Day MMcfd (9)	Annual Bcf (10)	Peak Day MMcfd (11)	Annual Bcf (12)	Peak Day MMcfd (13)
(1)												
1. Total demand East of Alberta taking into account the effects of peak shaving and storage operations. (see Appendix 8, Columns 15, 16 and 17)	425.8	1,374	468.2	1,470	518.8	1,603	561.0	1,713				
2. Emerson Export - Trans-Canada	74.0	223	74.0	223	74.0	223	74.0	223				
3. Cornwall Export - Niagara Gas	3.8	17	3.8	17	3.8	17	3.8	17				
4. Emerson Export - Trans-Canada	8.0	25	52.3	143	52.3	143	52.3	143				
5. Vermont Export - Trans-Canada	6.5	18	6.5	18	6.5	18	6.5	18				
6. Niagara Falls - Trans-Canada	20.7	-	-	-	-	-	-	-				
7. Union Gas Import	(15.5)	(34)	(15.5)	(34)	(15.5)	(34)	(15.5)	(34)				
8. Niagara Falls Import - Trans-Canada	(25.5)	(70)	(20.4)	(56)	(15.3)	(42)	(10.2)	(28)				
9. Other production	(72.8)	(281)	(70.8)	(269)	(74.7)	(277)	(69.0)	(241)				
10. Pipeline fuel and losses and Empress Plant Shrinkage in Alberta	13.0	40	16.4	62	19.3	58	23.3	62				
11. Proposed Export	-	-	-	-	32.1	88	32.1	88				
12. Total forecast market demand East of Alberta to be served by Trans-Canada	438.0	1,312	514.5	1,574	601.3	1,796	658.3	1,960				





## NOTES TO APPENDIX 9

This table shows the markets to be served by Trans-Canada from reserves in fields under contract to Trans-Canada. These demands were used in the computer program in the study of Trans-Canada's ability to meet the forecast requirements.

1. Columns (2) to (9) show the annual and peak-day requirements for the years 1966 to 1969 inclusive.
2. Line 1 shows the annual and peak-day requirements East of Alberta after taking into account the effects of peak-shaving and storage operations.
3. Lines 2 to 6 inclusive show authorized exports East of Alberta.
4. Lines 7 and 8 show authorized imports East of Alberta.
5. Line 9 shows a forecast of gas production, other than production available to Trans-Canada, serving the market East of Alberta. While it was assumed that this "other" production would decline beyond 1969 and that additional volumes of gas would be required because of the decline, these additional volumes were assumed to be supplied from reserves other than those presently under contract to Trans-Canada.
6. Line 10 shows pipe line fuel and losses and shrinkage at the gas processing plant at Empress in Alberta which should be debited to reserves in fields available to

Trans-Canada.

7. Line 11 shows the additional annual and peak-day volumes requested by Trans-Canada for export at Emerson.
8. Line 12 shows the total market demand presently forecasted to be met by Trans-Canada from reserves available to it.

TRANS-CANADA PIPE LINES SYSTEM  
REQUIREMENTS AND DEFICIENCIES  
(1,000 Btu's Per Cubic Foot)

Year	Trans-Canada Estimate				National Energy Board Estimate			
	Requirements		Deficiencies		Requirements		Deficiencies	
	Annual	Peak	Annual	Peak	Annual	Peak	Annual	Peak
	Bcf	MMcf/d	Bcf	MMcf/d	Bcf	MMcf/d	Bcf	MMcf/d
1966	389.5	1,209	-	-	438.0	1,312	-	-
1967	440.0	1,340	-	-	514.5	1,574	-	-
1968	576.5	1,673	-	-	601.3	1,796	-	-
1969	635.9	1,896	-	-	658.3	1,960	-	-
1970	667.4	2,005	-	-	663.6	1,974	-	-
1971	667.4	2,005	-	-	668.9	1,989	-	-
1972	667.4	2,005	-	-	669.0	1,989	-	-
1973	667.4	2,005	-	-	669.0	1,989	-	-
1974	667.4	2,005	-	-	669.0	1,989	-	-
1975	667.4	2,005	-	-	669.0	1,989	-	-
1976	667.4	2,005	-	-	669.0	1,989	-	-
1977	667.4	2,005	-	-	685.1	2,024	-	-
1978	667.4	2,005	-	-	685.1	2,024	-	-
1979	667.4	2,005	-	-	685.1	2,025	12.3	36
1980	667.4	2,005	13.8	42	645.9	2,009	41.0	129
1981	667.4	2,005	52.6	158	643.4	2,009	68.9	216
1982	667.4	2,005	95.2	287	605.2	1,778	37.3	110
1983	667.4	2,005	161.6	486	604.9	1,777	75.8	223
1984	667.4	2,005	195.3	587	604.9	1,777	139.6	410
1985	667.4	2,005	225.7	679	604.9	1,777	223.3	656
1986	667.4	2,005	275.3	828	604.9	1,777	258.8	761
1987	667.4	2,005	337.1	1,014	604.9	1,777	312.6	919
1988	667.4	2,005	384.4	1,156	604.9	1,777	339.4	998
1989	667.4	2,005	406.6	1,223	604.9	1,777	369.7	1,087
1990	667.4	2,005	426.7	1,283	544.1	1,611	340.8	1,009
TOTAL	16,057.3		2,574.3		15,617.8		2,219.5	





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## NOTES TO APPENDIX 11

### Notes Applicable to Trans-Canada Pipe Lines Limited Estimates of Canadian Annual Demand for Natural Gas

1. Demand estimates for British Columbia and Alberta include pipe line fuel.
2. Demand estimates for other provinces exclude Trans-Canada's pipe line fuel.
3. Demand estimates for Saskatchewan include Trans-Canada's share of the market but exclude its pipe line fuel.
4. Demand estimates for Ontario include those for Sault Ste. Marie commencing November 1967 and also include estimates for the following Quebec areas supplied across the provincial boundary at Hull and at Rouyn-Noranda.
5. Imports from the United States deducted comprise:
  - (a) by Trans-Canada at Niagara Falls to 1970 by Licence GLI-2
  - (b) by Union at Windsor to 1976
  - (c) by Trans-Canada at Sarnia in 1967 and 1968 as applied for.





NATIONAL ENERGY BOARD  
 DIVISION OF RENEWABLE ENERGY SOURCES  
 FOR 1980 AND FROM 1981 TO 1990 (Billion Btu)

(Values of Total Fuel at Standard Conditions 34.5 psia, 60°F, 1,000 Btu/lb)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	2968	2969	2970	2971	2972	2973	2974	2975	2976	2977	2978	2979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## NOTES TO APPENDIX 12

This table shows the Board's estimates of Canadian demand by provinces and category of use for 1966 to 1995 inclusive. These estimates are the result of a complete re-evaluation of natural gas demand in Canada and supersede any previous estimates made by the Board.

1. Quebec - Sales in Quebec include sales by Quebec Natural Gas Corporation, Le Société Gazifère de Hull, Le Gaz Provincial du Nord de Québec Ltée and sales in the proximity of the Vermont extension.
2. Ontario - Sales in Ontario exclude sales in the Hull and Rouyn-Noranda areas which are supplied by subsidiaries of Ontario distributors. Trans-Canada's estimates included these sales in the Ontario demand.
3. Saskatchewan - Sales in Saskatchewan include sizeable quantities of natural gas allocated for use for thermal generation of electricity, particularly in the years up to 1970.
4. Alberta - Overall sales in Alberta are based on the estimates prepared by the Alberta Oil and Gas Conservation Board in November 1964. However, within the Alberta estimates, independent projections were made for the three main categories of sales. The item "Other Industrial", originally a contingent demand in the Alberta estimates, was treated as a residual between



the overall sales estimates and the estimates for residential, commercial and normal industrial sales.

5. Pipe line Fuel and Losses East of British Columbia - This item includes all fuel and losses which are incurred by pipe lines and distributors. If natural gas should be transported through the United States to eastern markets, pipe line fuel and losses associated with this movement were accounted for as if they occurred in Canada.
6. British Columbia - Sales in British Columbia include sizeable quantities of natural gas being used for thermal generation of electricity up to 1969. It was further assumed that a pipe line would be built to Prince Rupert, commencing operation in 1967. It was also assumed that natural gas would be available to Vancouver Island by late 1969.
7. Pipe line Fuel and Losses, British Columbia - As with pipe line fuel and losses east of British Columbia, this item includes fuel and losses associated with domestic and export demand which occur in British Columbia.
8. Canada - Sales in New Brunswick are excluded since these are not met by supplies from Western Canadian sources.

**NATIONAL ENERGY BOARD**  
**ESTIMATED NATURAL GAS MARKET REQUIREMENTS IN CANADA 1966-1995**  
**GROWING ESTIMATED ANNUAL DEMAND AND AVAILABLE DAILY MARKET FIRM DEMAND**

Page 1 of 1

L.P.R.V.		ONTARIO			KENTUCKY			SASKEWAN			ALBERTA			P.E.I. & N.S.			TOTAL EAST OF R.C.			BRITISH COLUMBIA			P.U.I. & N.W.S.T.			TOTAL BRITISH COLUMBIA			TOTAL CANADA		
Year	Annual Peak 1970/71	Year 1970/71	L.P. 5	Annual Peak 1970/71	Year 1970/71	L.P. 5	Annual Peak 1970/71	Year 1970/71	L.P. 5	Annual Peak 1970/71	Year 1970/71	L.P. 5	Annual Peak 1970/71	Year 1970/71	L.P. 5	Annual Peak 1970/71	Year 1970/71	L.P. 5	Annual Peak 1970/71	Year 1970/71	L.P. 5	Annual Peak 1970/71	Year 1970/71	L.P. 5	Annual Peak 1970/71	Year 1970/71	L.P. 5	Annual Peak 1970/71	Year 1970/71	L.P. 5	Year
1966	12.0	127	72.9	255.2	1,110	57.4	17.2	234	1,110	57.4	17.2	234	1,110	57.4	17.2	234	1,110	57.4	17.2	234	1,110	57.4	17.2	234	1,110	57.4	17.2	234	1,110	57.4	1966
1967	12.0	116	72.7	255.0	1,100	57.0	16.8	234	1,100	57.0	16.8	234	1,100	57.0	16.8	234	1,100	57.0	16.8	234	1,100	57.0	16.8	234	1,100	57.0	16.8	234	1,100	57.0	1967
1968	12.0	114	72.6	254.8	1,095	56.8	16.7	233	1,095	56.8	16.7	233	1,095	56.8	16.7	233	1,095	56.8	16.7	233	1,095	56.8	16.7	233	1,095	56.8	16.7	233	1,095	56.8	1968
1969	11.9	113	72.5	254.6	1,090	56.6	16.6	232	1,090	56.6	16.6	232	1,090	56.6	16.6	232	1,090	56.6	16.6	232	1,090	56.6	16.6	232	1,090	56.6	16.6	232	1,090	56.6	1969
1970	11.8	112	72.4	254.4	1,085	56.4	16.5	231	1,085	56.4	16.5	231	1,085	56.4	16.5	231	1,085	56.4	16.5	231	1,085	56.4	16.5	231	1,085	56.4	16.5	231	1,085	56.4	1970
1971	11.7	111	72.3	254.2	1,080	56.2	16.4	230	1,080	56.2	16.4	230	1,080	56.2	16.4	230	1,080	56.2	16.4	230	1,080	56.2	16.4	230	1,080	56.2	16.4	230	1,080	56.2	1971
1972	11.6	110	72.2	254.0	1,075	56.0	16.3	229	1,075	56.0	16.3	229	1,075	56.0	16.3	229	1,075	56.0	16.3	229	1,075	56.0	16.3	229	1,075	56.0	16.3	229	1,075	56.0	1972
1973	11.5	109	72.1	253.8	1,070	55.8	16.2	228	1,070	55.8	16.2	228	1,070	55.8	16.2	228	1,070	55.8	16.2	228	1,070	55.8	16.2	228	1,070	55.8	16.2	228	1,070	55.8	1973
1974	11.4	108	72.0	253.6	1,065	55.6	16.1	227	1,065	55.6	16.1	227	1,065	55.6	16.1	227	1,065	55.6	16.1	227	1,065	55.6	16.1	227	1,065	55.6	16.1	227	1,065	55.6	1974
1975	11.3	107	71.9	253.4	1,060	55.4	16.0	226	1,060	55.4	16.0	226	1,060	55.4	16.0	226	1,060	55.4	16.0	226	1,060	55.4	16.0	226	1,060	55.4	16.0	226	1,060	55.4	1975
1976	11.2	106	71.8	253.2	1,055	55.2	15.9	225	1,055	55.2	15.9	225	1,055	55.2	15.9	225	1,055	55.2	15.9	225	1,055	55.2	15.9	225	1,055	55.2	15.9	225	1,055	55.2	1976
1977	11.1	105	71.7	253.0	1,050	55.0	15.8	224	1,050	55.0	15.8	224	1,050	55.0	15.8	224	1,050	55.0	15.8	224	1,050	55.0	15.8	224	1,050	55.0	15.8	224	1,050	55.0	1977
1978	11.0	104	71.6	252.8	1,045	54.8	15.7	223	1,045	54.8	15.7	223	1,045	54.8	15.7	223	1,045	54.8	15.7	223	1,045	54.8	15.7	223	1,045	54.8	15.7	223	1,045	54.8	1978
1979	10.9	103	71.5	252.6	1,040	54.6	15.6	222	1,040	54.6	15.6	222	1,040	54.6	15.6	222	1,040	54.6	15.6	222	1,040	54.6	15.6	222	1,040	54.6	15.6	222	1,040	54.6	1979
1980	10.8	102	71.4	252.4	1,035	54.4	15.5	221	1,035	54.4	15.5	221	1,035	54.4	15.5	221	1,035	54.4	15.5	221	1,035	54.4	15.5	221	1,035	54.4	15.5	221	1,035	54.4	1980
1981	10.7	101	71.3	252.2	1,030	54.2	15.4	220	1,030	54.2	15.4	220	1,030	54.2	15.4	220	1,030	54.2	15.4	220	1,030	54.2	15.4	220	1,030	54.2	15.4	220	1,030	54.2	1981
1982	10.6	100	71.2	252.0	1,025	54.0	15.3	219	1,025	54.0	15.3	219	1,025	54.0	15.3	219	1,025	54.0	15.3	219	1,025	54.0	15.3	219	1,025	54.0	15.3	219	1,025	54.0	1982
1983	10.5	99	71.1	251.8	1,020	53.8	15.2	218	1,020	53.8	15.2	218	1,020	53.8	15.2	218	1,020	53.8	15.2	218	1,020	53.8	15.2	218	1,020	53.8	15.2	218	1,020	53.8	1983
1984	10.4	98	71.0	251.6	1,015	53.6	15.1	217	1,015	53.6	15.1	217	1,015	53.6	15.1	217	1,015	53.6	15.1	217	1,015	53.6	15.1	217	1,015	53.6	15.1	217	1,015	53.6	1984
1985	10.3	97	70.9	251.4	1,010	53.4	15.0	216	1,010	53.4	15.0	216	1,010	53.4	15.0	216	1,010	53.4	15.0	216	1,010	53.4	15.0	216	1,010	53.4	15.0	216	1,010	53.4	1985
1986	10.2	96	70.8	251.2	1,005	53.2	14.9	215	1,005	53.2	14.9	215	1,005	53.2	14.9	215	1,005	53.2	14.9	215	1,005	53.2	14.9	215	1,005	53.2	14.9	215	1,005	53.2	1986
1987	10.1	95	70.7	251.0	1,000	53.0	14.8	214	1,000	53.0	14.8	214	1,000	53.0	14.8	214	1,000	53.0	14.8	214	1,000	53.0	14.8	214	1,000	53.0	14.8	214	1,000	53.0	1987
1988	10.0	94	70.6	250.8	995	52.8	14.7	213	995	52.8	14.7	213	995	52.8	14.7	213	995	52.8	14.7	213	995	52.8	14.7	213	995	52.8	14.7	213	995	52.8	1988
1989	9.9	93	70.5	250.6	990	52.6	14.6	212	990	52.6	14.6	212	990	52.6	14.6	212	990	52.6	14.6	212	990	52.6	14.6	212	990	52.6	14.6	212	990	52.6	1989
1990	9.8	92	70.4	250.4	985	52.4	14.5	211	985	52.4	14.5	211	985	52.4	14.5	211	985	52.4	14.5	211	985	52.4	14.5	211	985	52.4	14.5	211	985	52.4	1990
1991	9.7	91	70.3	250.2	980	52.2	14.4	210	980	52.2	14.4	210	980	52.2	14.4	210	980	52.2	14.4	210	980	52.2	14.4	210	980	52.2	14.4	210	980	52.2	1991
1992	9.6	90	70.2	250.0	975	52.0	14.3	209	975	52.0	14.3	209	975	52.0	14.3	209	975	52.0	14.3	209	975	52.0	14.3	209	975	52.0	14.3	209	975	52.0	1992
1993	9.5	89	70.1	249.8	970	51.8	14.2	208	970	51.8	14.2	208	970	51.8	14.2	208	970	51.8	14.2	208	970	51.8	14.2	208	970	51.8	14.2	208	970	51.8	1993
1994	9.4	88	70.0	249.6	965	51.6	14.1	207	965	51.6	14.1	207	965	51.6	14.1	207	965	51.6	14.1	207	965	51.6	14.1	207	965	51.6	14.1	207	965	51.6	1994
1995	9.3	87	69.9	249.4	960	51.4	14.0	206	960	51.4	14.0	206	960	51.4	14.0	206	960	51.4	14.0	206	960	51.4	14.0	206	960	51.4	14.0	206	960	51.4	1995

L.P., Load Factor



### NOTES TO APPENDIX 13

This table shows the Board's estimates of Canadian maximum daily market peak demand for 1966-1995 inclusive. These estimates take into account the historical relationships between maximum daily and average daily market demand, as well as the individual characteristics of market categories and their response to average climatic conditions.

1. Quebec - The marketing area of Quebec Natural, being at the end of Trans-Canada's pipe line system, is much more sensitive to load factor considerations than any other area in Canada. For the marketing area of Quebec Natural and along the extension to Vermont, the market load factor (before peak shaving) is expected to decline from the present level to about 59 per cent in 1995. In the Hull and Rouyn-Noranda areas a load factor of 90 per cent was assumed as a result of large industrial potential.
2. Ontario - A slightly increasing load factor is projected which is largely a result of proportionately more industrial sales and the new marketing procedure of having some commercial sales subject to interruptions. It is in the marketing area of Union that the load factor has shown the greatest improvement in recent years. With



more industrial sales expected, especially in the Union area, it is reasonable to assume that the overall load factor would improve.

3. Manitoba - The historical load factor for Greater Winnipeg Gas Company has varied from a low of 39.3 per cent to a high of 48.2 per cent. The company supplies about 85 per cent of the market. It has a 65 per cent load factor contract with Trans-Canada, the only one of its kind. The calculated market load factor for Manitoba is expected to remain virtually the same throughout the period.
4. Saskatchewan - Historically, the Saskatchewan Power Corporation which supplies virtually all of the Province, has had a load factor up to 47 per cent. It is anticipated that this will improve somewhat because of proportionately higher industrial sales.
5. Alberta - Maximum daily demand figures as given by Trans-Canada were accepted. Historically, the combined load factor of the two main utilities, Western Canadian Natural Gas Company and Northwestern Utilities Limited, has been between 43 per cent and 54 per cent. Expected increased industrial demand with a high load factor should increase the provincial load factor slightly.

6. Pipe line Fuel and Losses - These were taken to be proportionate to pipe line throughputs.



Assumptions Used by Trans-Canada in Computation  
of Cost of Transmission

	<u>Canada</u>	<u>United States</u>
Depreciation	Straight line at the rate of 2% for pipe, 3 1/2% for compressor and meter stations and 11% for general plant equipment	Straight line at the rate of 3 1/2%
General Taxes	0.03% of gross capital investment annually as provincial tax, plus 0.4% of gross capital investment annually as municipal tax, this latter undergoing a simple increase of 5% per year to the end of the study	2% of gross capital investment
Rate Base	Gross capital investment plus working capital, less depreciation averaged over the past year	Same as Canada
Return	8% of rate base; subsequently 7 1/2% and 7% of rate base were submitted upon request	As given in the Great Lakes application to the FPC: 1966-67, 0.96% 1967-68, 4.45% 1968-69, 5.53% 1969-70, 6.15% Thereafter, 6.5% of rate base
Taxable Income	Total annual cost of service less: operating and maintenance expenditures; depreciation and excess depreciation; general taxes; interest; and loss carry-over	Same as Canada except that excess depreciation item is not applicable
Income Tax	52% of taxable income	49.04% of taxable income
Rate of Interest on Mortgage Bonds	Not given	5.25%





## TRANS-CANADA PIPE LINES LIMITED

TOTAL COST OF TRANSMISSION WITH AND WITHOUT GREAT LAKES  
(\$000)

(BASED ON DATA FURNISHED BY TRANS-CANADA)

YEAR	WITH GREAT LAKES	WITHOUT GREAT LAKES			
		HIGH FORECAST 36" PIPE		LOW FORECAST 36" PIPE	
1	2	3	4	5	6
<u>8 PER CENT RATE OF RETURN</u>					
1967	82,260	102,306	99,796	91,641	69,499
1968	108,797	117,523	113,197	103,687	100,605
1969	118,284	120,266	116,777	108,725	104,954
1970	123,981	123,745	121,207	115,171	110,654
1971	131,429	128,808	130,367	120,918	115,776
TOTAL (1 - 5 YRS)	564,751	592,648	581,344	540,142	521,488
1972	136,827	133,519	135,349	125,903	121,322
1973	146,507	137,870	148,016	131,244	131,403
1974	163,346	159,628	167,361	152,620	149,585
1975	174,012	171,807	177,342	161,430	159,334
1976	185,441	181,270	187,862	169,727	170,138
TOTAL (5 - 10 YRS)	806,113	784,094	815,930	740,924	731,782
TOTAL (1 - 10 YRS)	1,370,864	1,376,742	1,397,274	1,281,066	1,253,270
<u>7-1/2 PER CENT RATE OF RETURN</u>					
1967	79,422	98,472*			86,242
1968	105,772	113,231			97,025
1969	115,175	115,895			101,237
1970	120,809	119,250			106,753
1971	128,171	124,169			111,709
TOTAL (1 - 5 YRS)	549,349	571,017			502,966
1972	133,522	128,804			117,100
1973	138,419	133,108			123,738
1974	144,191	138,883			126,118
1975	163,387	143,138			141,197
1976	174,645	158,268			155,696
TOTAL (5 - 10 YRS)	754,164	702,201			665,849
TOTAL (1 - 10 YRS)	1,303,513	1,273,218			1,168,815
<u>7 PER CENT RATE OF RETURN</u>					
1967	76,584	94,639*			82,896
1968	102,746	108,940			93,445
1969	112,067	111,524			97,522
1970	117,637	114,756			102,852
1971	124,913	119,531			107,642
TOTAL (1 - 5 YRS)	533,937	549,390			484,357
1972	130,217	124,089			112,878
1973	135,089	128,346			119,427
1974	140,814	134,088			123,769
1975	148,213	138,309			129,708
1976	162,516	142,891			141,096
TOTAL (5 - 10 YRS)	716,849	667,723			626,878
TOTAL (1 - 10 YRS)	1,250,786	1,217,113			1,111,235

\* EACH FIGURE UNDER THE 7-1/2 AND 7 PER CENT RATES OF RETURN IN COLUMN 3 WAS COMPUTED BY THE BOARD FROM TRANS-CANADA'S DATA FOR 8 PER CENT RATE OF RETURN FOR THE LAST THREE YEARS. INCOME TAX WAS ALSO RECALCULATED.



TRANS-CANADA PIPE LINES LIMITED  
AVERAGE COST OF TRANSMISSION WITH AND WITHOUT GREAT LAKES  
 (\$/MCF)  
 (BASED ON DATA FURNISHED BY TRANS-CANADA)

YEAR	WITH GREAT LAKES	WITHOUT GREAT LAKES			
		HIGH FORECAST 36" PIPE	30" PIPE	LOW FORECAST 36" PIPE	30" PIPE
1	2	3	4	5	6
<u>8 PER CENT RATE OF RETURN</u>					
1967	16.62	22.43	21.88	21.12	20.61
1968	18.42	21.94	21.13	21.44	20.80
1969	19.01	21.59	20.97	21.64	20.89
1970	18.87	21.23	20.81	21.35	20.51
1971	18.67	20.53	20.79	21.07	20.17
WT. AV. (1 - 5 YRS)	18.40	21.48	21.07	21.32	20.58
1972	18.45	20.13	20.40	20.64	19.89
1973	18.77	19.76	21.21	20.37	20.39
1974	19.79	21.67	22.73	22.34	21.90
1975	20.21	22.26	22.98	22.48	22.18
1976	20.54	22.30	23.12	22.35	22.40
WT. AV. (5 - 10 YRS)	19.61	21.29	22.16	21.70	21.43
WT. AV. (1 - 10 YRS)	19.09	21.37	21.69	21.54	21.07
<u>7-1/2 PER CENT RATE OF RETURN</u>					
1967	16.04	21.59*			19.87
1968	17.91	21.14			20.06
1969	18.51	20.80			20.15
1970	18.39	20.46			19.79
1971	18.21	19.79			19.46
WT. AV. (1 - 5 YRS)	17.90	20.70			19.85
1972	18.00	19.42			19.20
1973	17.74	19.07			19.20
1974	17.47	18.85			18.75
1975	18.97	18.55			19.66
1976	19.34	19.47			20.50
WT. AV. (5 - 10 YRS)	18.34	19.07			19.50
WT. AV. (1 - 10 YRS)	18.15	19.77			19.65
<u>7 PER CENT RATE OF RETURN</u>					
1967	15.47	20.75*			19.12
1968	17.39	20.34			19.32
1969	18.01	20.02			19.41
1970	17.91	19.69			19.06
1971	17.74	19.05			18.76
WT. AV. (1 - 5 YRS)	17.40	19.91			19.12
1972	17.56	18.71			18.51
1973	17.31	18.39			18.53
1974	17.06	18.20			18.12
1975	17.21	17.92			18.06
1976	18.00	17.58			18.58
WT. AV. (5 - 10 YRS)	17.44	18.13			18.36
WT. AV. (1 - 10 YRS)	17.42	18.90			18.68

\* EACH FIGURE UNDER THE 7-1/2 AND 7 PER CENT RATES OF RETURN IN COLUMN 3 WAS COMPUTED BY THE BOARD FROM TRANS-CANADA'S DATA FOR 8 PER CENT RATE OF RETURN FOR THE LAST THREE YEARS. INCOME TAX WAS ALSO RECALCULATED.





TRANS-CANADA PIPE LINES LIMITED  
AVERAGE COST OF TRANSMISSION PER COMMODITY MILE  
WITH AND WITHOUT GREAT LAKES  
¢ MCF/100 MILES

(BASED ON DATA FURNISHED BY TRANS-CANADA)

YEAR	WITH GREAT LAKES	WITHOUT GREAT LAKES			
		HIGH FORECAST		LOW FORECAST	
		36" PIPE	30" PIPE	36" PIPE	30" PIPE
1	2	3	4	5	6
<u>8 PER CENT RATE OF RETURN</u>					
1967	1.530	1.691	1.649	1.642	1.604
1968	1.485	1.548	1.491	1.584	1.537
1969	1.460	1.503	1.459	1.572	1.517
1970	1.457	1.475	1.445	1.537	1.478
1971	1.420	1.404	1.421	1.499	1.435
WT. AV. (1 - 5 YRS)	1.464	1.511	1.483	1.561	1.507
1972	1.402	1.374	1.393	1.466	1.413
1973	1.428	1.347	1.446	1.443	1.445
1974	1.515	1.484	1.556	1.589	1.557
1975	1.543	1.522	1.571	1.595	1.574
1976	1.561	1.515	1.571	1.577	1.581
WT. AV. (5 - 10 YRS)	1.494	1.453	1.512	1.538	1.519
WT. AV. (1 - 10 YRS)	1.482	1.478	1.500	1.548	1.514
<u>7-1/2 PER CENT RATE OF RETURN</u>					
1967	1.477	1.627*			1.545
1968	1.443	1.492			1.482
1969	1.421	1.448			1.464
1970	1.419	1.421			1.425
1971	1.385	1.353			1.385
WT. AV. (1 - 5 YRS)	1.424	1.456			1.454
1972	1.368	1.326			1.363
1973	1.349	1.300			1.361
1974	1.337	1.291			1.334
1975	1.449	1.268			1.395
1976	1.470	1.223			1.447
WT. AV. (5 - 10 YRS)	1.398	1.301			1.382
WT. AV. (1 - 10 YRS)	1.409	1.367			1.412
<u>7 PER CENT RATE OF RETURN</u>					
1967	1.425	1.564*			1.487
1968	1.402	1.435			1.428
1969	1.383	1.393			1.410
1970	1.382	1.368			1.373
1971	1.349	1.303			1.334
WT. AV. (1 - 5 YRS)	1.384	1.401			1.400
1972	1.334	1.277			1.314
1973	1.317	1.254			1.313
1974	1.306	1.246			1.289
1975	1.315	1.225			1.282
1976	1.368	1.195			1.311
WT. AV. (5 - 10 YRS)	1.329	1.237			1.301
WT. AV. (1 - 10 YRS)	1.352	1.306			1.343

\* EACH FIGURE UNDER THE 7-1/2 AND 7 PER CENT RATES OF RETURN IN COLUMN 3 WAS COMPUTED BY THE BOARD FROM TRANS-CANADA'S DATA FOR 8 PER CENT RATE OF RETURN FOR THE LAST THREE YEARS. INCOME TAX WAS ALSO RECALCULATED.



TOTAL COST OF TRANSMISSION  
With and Without Great Lakes  
7½% Rate of Return  
\$(000)

<u>YEAR</u>	<u>WITH GREAT LAKES</u>		<u>WITHOUT GREAT LAKES</u>
	As Submitted by <u>Trans-Canada</u>	As Adjusted by the National <u>Energy Board</u>	<u>High Forecast</u> <u>36" pipe</u>
1	2	3	4
1967	79,422	89,776	98,472*
1968	105,772	106,524	113,231
1969	115,175	109,236	115,895
1970	120,809	114,253	119,250
1971	128,171	121,545	124,169
Total (1-5 years)	549,349	541,374	571,017
1972	133,522	126,904	128,804
1973	138,419	131,663	133,108
1974	144,191	137,044	138,883
1975	163,387	155,680	143,138
1976	174,645	166,775	158,268
Total (5-10 years)	754,164	718,066	702,201
" (1-10 years)	1,303,513	1,259,440	1,273,218

\*Each figure in Column 4 was computed by the Board from Trans-Canada's data for 8 per cent rate of return for the last three years. Income tax was also recalculated.





Notes to Appendix 18  
(Calculation of Column 3)

(a) Column 3 is calculated by the following formula:

$$X = A + G - FT - LM \quad (1)$$

where X - represents the costs for "With Great Lakes" as corrected by the National Energy Board.

A - the annual total costs "With Great Lakes" as submitted by Trans-Canada (Vol. 9, Tab 11, p. 2, l. 9).

G - the extra cost of purchasing gas at Austin during 1967 and 1968. See Appendix 22. "G" does not include customs duty.

F - the annual average cost per Mcf of moving the contingent sales (contingent exports, plus Sault Ste. Marie sales) from Burstall to Emerson. (see (b) below.)

S - the annual delivery volume "With Great Lakes" (Vol. 6, Tab 3, p. 1).

V - the annual delivery volume "Without Great Lakes" high forecast sales (Vol. 6, Tab 3, p. 12, l. 12).

T = S - V = the annual volume of contingent sales.

L - the annual average cost/Mcf of moving the Sault Ste. Marie gas sales from Emerson to the Sault (see (e) below).

M - the annual volume of sales at Sault Ste. Marie (Vol. 9, Tab 13, p. 7).

Equation (1), adds Trans-Canada's total costs to the extra cost of purchasing gas at Austin and subtracts from this sub-total both the cost of transmission of the contingent exports from Burstall to Emerson and the cost of transmission of the Sault Ste. Marie sales from Burstall to Sault Ste. Marie.

(b) F, the annual average cost per Mcf of moving the contingent sales from Burstall to Emerson is calculated using the following formula:

$$F = \left[ \frac{A - \left( A \times \frac{B}{B+C} \right)}{T} \times R \right] + K \quad (I)$$

Notes to Appendix 18

where B - represents the annual commodity miles "Without Great Lakes", high forecast sales.

C - the annual commodity miles for transportation of contingent sales from Burstall to Emerson.

R - a correction factor (see "c" below).

K - the annual cost per Mcf of moving gas from station 41 to Emerson as estimated by the Board's computer study (see "d" below).

(c)  $R = \frac{5.95}{8.517}$  if the rate of return is  $7\frac{1}{2}\%$ .

In Volume 9, Tab 12, Trans-Canada has presented the figure 6.17¢ per Mcf as the cost of gas transmission from Burstall to Station 41 in 1971 if the rate of return is 8%. The figure 5.95 is the equivalent cost as calculated by the Board for a rate of return of  $7\frac{1}{2}\%$ .

The figure 8.52 is the cost per Mcf as computed from the formula  $\left[ \frac{A - \left( A \times \frac{B}{B+C} \right)}{T} \right]$  for the year 1971. (i.e. -

the transmission cost of contingent sales calculated as being proportional to their share of total commodity miles in the whole system.)

Therefore, equation (II) varies the cost of gas transmission given by Trans-Canada for Burstall to Station 41 in 1971 in the same proportion as total system costs vary during the period under study.

(d)

"K"

The Estimated Cost of Gas Transmission  
from Winnipeg to Emerson as Calculated  
by the Board's Computer Study  
(¢/Mcf)

Year	<u><math>7\frac{1}{2}\%</math> Rate of Return</u>
1967	1.49
1968	.88
1969	.89
1970	.89
1971	.85
1972	.84
1973	.80
1974	.80
1975	.79
1976	.75

Notes to Appendix 18

(e)

"L"

Annual Cost of Transmission of  
Deliveries to Sault Ste. Marie  
From Emerson

<u>Year</u>	<u>Cost of Transmission through Great Lakes (\$000)</u>	<u>Volume Delivered to Trans-Canada Mcf</u>	<u>Average Cost of Transmission ¢/Mcf-Canadian</u>
1	2	3	4
1968	20,259	136,298	14.86
1969	27,317	183,778	14.86
1970	30,925	208,050	14.86
1971	34,995	234,750	14.91
1972	35,619	256,914	13.86
1973	38,011	281,403	13.51
1974	40,997	305,326	13.43
1975	46,357	329,947	14.05
1976	52,116	361,530	14.42

Source: Application by Trans-Canada Pipe Lines  
Limited for Great Lakes Project.

Col. 2: V.6, Tab 3, p.2, LL. 10-11.

Col. 3: V.6, Tab 3, p.2, LL. 9-11.

Col. 4: Col. 2 ÷ Col. 3.





AVERAGE COST OF TRANSMISSION  
With and Without Great Lakes  
7½% Rate of Return  
(¢/Mcf)

YEAR	WITH GREAT LAKES		WITHOUT GREAT LAKES
	As Submitted by Trans-Canada	As Corrected by the National Energy Board	High Forecast 36" Pipe
1	2	3	4
1967	16.04	19.68	21.59*
1968	17.91	19.89	21.14
1969	18.51	19.62	20.80
1970	18.39	19.61	20.46
1971	18.21	19.37	19.79
Wt. Av. (1-5 yrs)	17.90	19.62	20.70
1972	18.00	19.13	19.42
1973	17.74	18.87	19.07
1974	17.47	18.60	18.85
1975	18.97	20.17	18.55
1976	19.34	20.52	19.47
Wt. Av. (5-10 yrs)	18.34	19.50	19.07
Wt. Av. (1-10 yrs)	18.15	19.55	19.77

Column 3 is calculated by dividing Column 3 of Appendix 18 by annual sales for the "high forecast".

\*Each figure in Column 4 was computed by the Board from Trans-Canada's data for 8 per cent rate of return for the last three years. Income tax was also recalculated.



AVERAGE COST PER COMMODITY MILE  
 With and Without Great Lakes  
 $7\frac{1}{2}\%$  Rate of Return  
 ¢/Mcf/100 Miles

YEAR	WITH GREAT LAKES		WITHOUT GREAT LAKES	
	As Submitted by Trans-Canada	As Adjusted by the National Energy Board	High Forecast 36" pipe	As Submitted by Trans-Canada Low Forecast 30" pipe
1	2	3	4	5
1967	1.477	1.483	1.627*	1.545
1968	1.443	1.403	1.492	1.482
1969	1.421	1.365	1.448	1.464
1970	1.419	1.362	1.421	1.425
1971	1.385	1.325	1.353	1.385
Wt.Av. (1-5 yrs)	1.424	1.381	1.456	1.454
1972	1.368	1.306	1.326	1.363
1973	1.349	1.286	1.300	1.361
1974	1.337	1.274	1.291	1.334
1975	1.449	1.379	1.268	1.395
1976	1.470	1.394	1.323	1.447
Wt.Av. (5-10 yrs)	1.398	1.331	1.301	1.382
Wt.Av. (1-10 yrs)	1.409	1.352	1.367	1.412

Column 2 is calculated by dividing Column 2 of Appendix 18 by annual commodity miles as shown by Trans-Canada for the Great Lakes Project. Column 2 is not comparable with other columns.

Column 3 is calculated by dividing Column 3 of Appendix 18 by annual commodity miles for the "high sales forecast, without Great Lakes".

\*Each figure in Column 4 was computed by the Board from Trans-Canada's data for 8 per cent rate of return for the last three years. Income tax was also recalculated.





NATIONAL ENERGY BOARD

PROFITABILITY OF CONTINGENT EXPORTS

<u>YEAR</u>	<u>CONTRACT QUANTITY</u> Mcf/d	<u>DEMAND CHARGE</u> \$/Mcf/No.U.S.	<u>COMMODITY CHARGE</u> ¢/Mcf U.S.	<u>ANNUAL SALES VOLUME</u> MMcf	<u>PRICE</u> ¢/Mcf Cdn.
(1)	(2)	(3)	(4)	(5)	(6)
1967				3,000	29.92
1968	29,200	2.422	19.323	10,378	29.70
1969	56,500	2.422	19.323	20,010	29.73
1970	81,100	2.422	19.323	28,701	29.74
1971	87,600	2.706	19.745	30,816	31.29
1972	87,600	2.706	19.745	32,100	30.90
1973	87,600	2.706	19.745	32,100	30.90
1974	87,600	2.706	19.745	32,100	30.90
1975	87,600	2.706	19.745	32,100	30.90
1976	87,600	2.990	20.117	32,100	32.30

SOURCE: Application by Trans-Canada Pipe Lines Limited for  
Great Lakes Project - Vol. 4, Tab 6

Year 1967: Special price as per letter agreement  
between Trans-Canada and Great Lakes  
dated 1 Nov. 1965

Col. 2: Vol. 4; Tab 5; Exhibit B, p. 4.

Col. 3: Vol. 4; Tab 5; Exhibit B, p. 6.

Col. 4: Vol. 4; Tab 5; Exhibit B, p. 6.

Col. 5: Vol. 6; Tab 2; pp. 1-4, line 35 up to 1971.  
Then 32,100 MMcf is used because this is  
the maximum export volume applied for by  
Trans-Canada.

The price in Canadian currency can be calculated for 1967 by  
 $27.7 \times 1.08$

and for 1968 - 1976 by  
$$\left[ \frac{(\text{Col. 2} \times 12 \times \text{Col. 3}) + (\text{Col. 4} \times \text{Col. 5})}{\text{Col. 5}} \right] \times 1.08$$

where 1.08 is the rate of exchange between the Canadian and  
U.S. dollar.

NATIONAL ENERGY BOARD  
PROFITABILITY OF CONTINGENT EXPORTS

<u>YEAR</u>	<u>CONTRACT QUANTITY</u> Mcf/d	<u>DEMAND CHARGE</u> \$/Mcf/Mo. U.S.	<u>COMMODITY CHARGE</u> ¢/Mcf U.S.	<u>ANNUAL SALES VOLUME</u> MMcf	<u>PRICE</u> ¢/Mcf Cdn.
1	2	3	4	5	6
1967	116,332	2.422	19.323	36,000	31.01
1968	116,332	2.422	19.323	36,000	31.01
1969	116,332	2.422	19.323	36,000	31.01
1970	116,332	2.422	19.323	36,000	31.01
1971	116,332	2.706	19.745	36,000	32.66
1972	116,332	2.706	19.745	36,000	32.66
1973	116,332	2.706	19.745	36,000	32.66
1974	116,332	2.706	19.745	36,000	32.66
1975	116,332	2.706	19.745	36,000	32.66
1976	116,332	2.990	20.117	36,000	34.25

SOURCE: Application by Trans-Canada Pipe Lines Limited for Great Lakes Project.

Col. 2: Vol. 1; Tab 8; p. 4.

Col. 3: Vol. 1; Tab 8; p. 6.

Col. 4: Vol. 1; Tab 8; p. 6.

Col. 5: Vol. 6; Tab 2; pp. 1-4, line 36

Prices are calculated for the years 1967-1976 by the formula:

$$\frac{(\text{Col. 2} \times 12 \times \text{Col. 3}) + (\text{Col. 4} \times \text{Col. 5})}{\text{Col. 5}} \times 1.08$$

where 1.08 is the rate of exchange between the Canadian and U.S. dollar.

NATIONAL ENERGY BOARD  
PROFITABILITY OF CONTINGENT EXPORTS

<u>YEAR</u>	<u>SALE PRICE TO MIDWESTERN (¢/Mcf-Cdn)</u>	<u>SALE PRICE TO GREAT LAKES (¢/Mcf-Cdn)</u>	<u>COST OF GAS AT EMERSON (¢/Mcf-Cdn)</u>	<u>TOTAL PROFITS (\$000)</u>
1	2	3	4	5
1967	31.01	29.92	25.84	1,984
1968	31.01	29.70	25.81	2,276
1969	31.01	29.73	26.22	2,427
1970	31.01	29.74	26.46	2,579
1971	32.66	31.29	26.55	3,660
1972	32.66	30.90	26.66	3,521
1973	32.66	30.90	26.77	3,446
1974	32.66	30.90	26.96	3,317
1975	32.66	30.90	27.67	2,833
1976	34.25	32.30	27.95	3,664
TOTAL				29,707

SOURCE: Col. 2: Appendix 21; p. 2, Col. 6

Col. 3: Appendix 21; p. 1, Col. 6

Col. 4: Calculated from the sum of the cost at  
Burstall (estimated at 13.75¢/Mcf in 1967  
and escalating at .25¢ per year) plus the  
cost of transmission from Burstall to  
Emerson as estimated in Notes to Appendix 18.

Col. 5: Calculated for the years 1967-1976 by the  
formula:

$(\text{Col. 2} - \text{Col. 4}) \times 36,000 + (\text{Col. 3} - \text{Col. 4}) \times (\text{Col. 5; App. 21 p.1})$





NATIONAL ENERGY BOARDCALCULATION OF THE EQUIVALENT COST OF GAS TRANSMISSION  
ASSOCIATED WITH THE GAS PURCHASES AT AUSTIN  
1967 and 1968

\$(000)

- (1) Volume bought at Austin, 1967 = 51,645 MMcf  
(V. 6, T. 3, p. 2, 1.7).
- (2) Volume bought at Austin, 1968 = 23,058 MMcf  
(V. 6, T. 3, p. 2, 1.7).
- (3) Purchase price at Austin = 40.87¢/Mcf (US) = 44.14¢/  
Mcf Canadian.
- (4) Estimated cost of gas at Burstall, 1967 = 18.75¢/Mcf.
- (5) Estimated cost of gas at Burstall, 1968 = 19.00¢/Mcf.

The equivalent cost per Mcf of gas transmission must be considered as the difference between the purchase price at Austin and the purchase price at Burstall since the contingent exports at Emerson are treated as a separate transaction (i.e., the cost of moving export gas from Burstall to Emerson was deducted from the cost of transmission of the Great Lakes Project in obtaining the costs shown in Column 3 of Appendix 18).

The equivalent cost of transmission of these purchases at Austin will be:

1967: 51,645	(44.14 - 18.75)	=	\$13,113
1968: 23,058	(44.14 - 19.00)	=	<u>5,797</u>
Total			<u><u>\$18,910</u></u>



NATIONAL ENERGY BOARD

INTERIM REPORT TO  
THE GOVERNOR IN COUNCIL

In the matter of the application under  
the National Energy Board Act

of

TRANS-CANADA PIPE LINES LIMITED

to transport natural gas to Central Ontario  
via the United States of America  
with regard to those facilities required  
to be constructed in 1966 in any event

July 1966





## INTERIM REPORT TO THE GOVERNOR IN COUNCIL

In March the Board heard an application by Trans-Canada Pipe Lines Limited for certain certificates, licences and orders, which together are commonly referred to as "the Great Lakes Application". The application to this Board is the counterpart of an application by Great Lakes Transmission Company, which is owned to the extent of 50 per cent by Trans-Canada through a subsidiary, to the Federal Power Commission of the United States. If both applications were approved, Trans-Canada and affiliated and associated companies would construct facilities in Canada and the United States through which gas would be moved from Western Canada both to serve the incremental gas requirements of Southern Ontario and Quebec and to serve certain markets in the United States.

The matter is complex, and neither the Federal Power Commission nor this Board has yet completed the procedures necessary before determination of all the issues before the respective bodies. A motion has now come before the Board from a party, Panhandle Eastern Pipe Line Company, seeking leave to be heard by way of intervention in opposition to the application. The Board has deemed it necessary to hear argument by interested parties on the motion, and has set down a hearing on July 29 for that purpose. Whether the motion will be granted will be determined in the light of the argument then adduced; if it is granted, then a date must be set for hearing evidence,

examination thereof, and argument, upon such issues as might be specified for further hearing. It is not now possible to forecast accurately how much time will be required before the Board can report fully upon the original application.

Meanwhile, the 1966 construction season is far advanced, and Trans-Canada has represented to the Board that certain of the facilities which it seeks leave to construct in 1966 are necessary to provide proper and secure service to its customers in the winter of 1966-67, and to permit planned and necessary maintenance work on existing facilities to be carried out after installation of the new facilities. These facilities are:

- (a) those portions of pipe line necessary to complete the company's second line of pipe from the Alberta-Saskatchewan border to the vicinity of Winnipeg, being six sections of 34-inch pipe line totalling in all 63.6 miles in Saskatchewan and two sections totalling 25.3 miles of 34-inch pipe line in Manitoba;
- (b) the addition of compression capacity in the form of two 8,000 horsepower turbine driven compressors at Station 2 near Burstall, Saskatchewan, and one 12,100 horsepower turbine driven centrifugal compressor at Station 41 near Ile Des Chenes, Manitoba; and

(c) the installation of 12.1 miles of 24-inch pipe line in Ontario extending downstream of Station 130 and sometimes referred to as "the Markham loop".

The Board is satisfied that these facilities are required for the performance of Trans-Canada's obligations to deliver gas to its customers in the coming winter and to provide proper security for that performance in the event of failure of equipment on the system, and is further satisfied that the installation of these facilities will be necessary whatever may be the decision of the Board on the other parts of Trans-Canada's application. The Board is also satisfied that the approval of the construction and operation of these facilities will not in any way prejudice the disposition by the Board of the other parts of Trans-Canada's application.

As will be more fully shown in the full report of the Board, the Board is satisfied that, in relation to these facilities, the supply of gas under the control of the Applicant and the markets under contract to the Applicant, the design of the facilities, and the capacity of the Applicant to arrange financing for the necessary investment, amounting to some \$20.3 million, have all been satisfactorily demonstrated on the record. The Board finds that these facilities are and will continue to be required by the present and future public



convenience and necessity, and is prepared, subject to the approval of the Governor in Council, to issue a certificate in respect of them, subject to usual conditions.

The Board has not previously reported upon and requested approval for certification of facilities being only a portion of the facilities specified in an application on the whole of which the Board is not prepared to report. It does so in this case because it is convinced that the public interest may otherwise suffer unnecessary harm in the form of inadequate or interrupted deliveries of gas in the coming winter to customers who have contracted for such gas and will suffer hardship if it is not delivered. The Board regards this treatment as exceptional, as indeed is the length of time required to report upon the whole application.

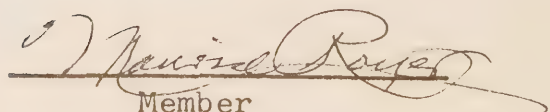
All of which is respectfully submitted.

A handwritten signature in dark ink, appearing to read "J. H.annon", written over a horizontal line.

Chairman

A handwritten signature in dark ink, appearing to read "Hughes M. Lewis", written over a horizontal line.

Member

A handwritten signature in dark ink, appearing to read "Maurice Rogers", written over a horizontal line.

Member

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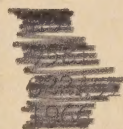


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